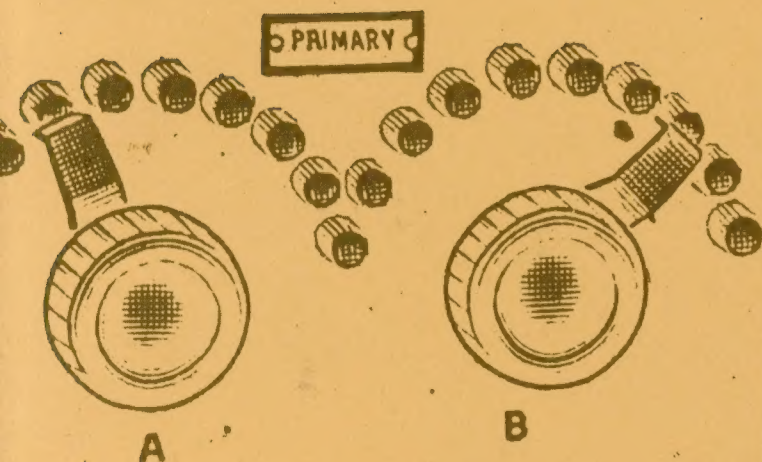


101 SHORTWAVE HOOKUPS

from Radio & Television Magazine



reprinted by Lindsay Publications Inc
PO Box 12, Bradley IL 60915 • 1990

101 SHORT WAVE HOOK=UPS

By the Editors of

RADIO & TELEVISION

Including —

Battery and A.C. Type Receivers

Regenerative Sets

Superheterodynes

Super-Regenerators

T.R.F. Receivers

Everything from 1 to 8 Tube Sets

Published by

RADIO & TELEVISION

20 VESEY STREET

NEW YORK, N. Y.

PREFACE

● This book has been prepared in response to many requests for a compilation of short-wave circuit diagrams which have appeared in *SHORT WAVE CRAFT* magazine during the past few years. Wherever possible, complete parts lists have been given with the diagrams and, in some cases photographs of the equipment are also included. Further, where it was deemed advisable, due to peculiarities in the construction of the receivers, additional data on special points of construction have been included. Coil-winding data has also been included for most of the sets.

For the convenience of the reader of this book, we have arranged the sets according to several well-known types, as will be observed by examining the

table of Contents. The so-called, "straight receivers", are either regenerative sets or regenerative sets with R.F. amplification. The other classes are: superheterodynes, super-regenerators, and transmitters. There is also a section devoted to A.C.-D.C. receivers. Under the heading "Miscellaneous" are included several sets which do not fall into the general classifications mentioned above.

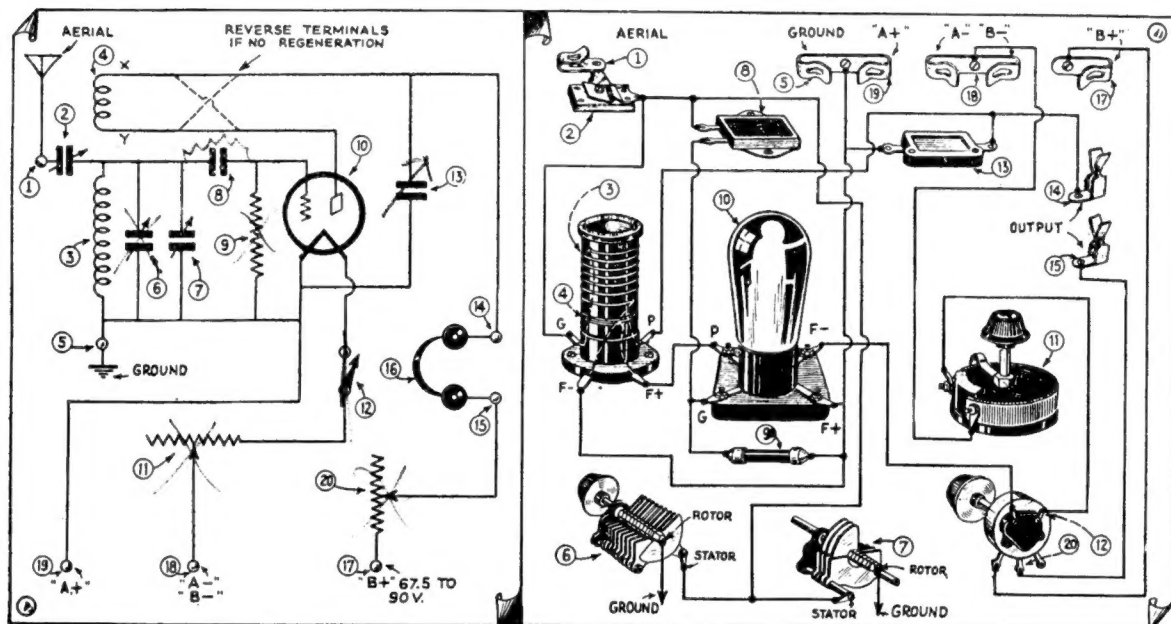
On many of the diagrams it will be noticed that there is a shield, stating that this set has been tested and approved by *SHORT WAVE CRAFT* magazine. This simply means that working models of these sets have been tried out and have proved successful.

—The Editor.

CONTENTS

Straight S-W Receivers		A 3-Tube Band-Spreader24		Building a 2-Tube Oscillodyne49	
2-Tube A.C. Band-Spreader	6	The Tetradyne 5-Tube Set	25	Armstrong "Super" 1-Tube	54
A Real 3-Tube Receiver	6	Master Composite—4	26	The "Easy-Build" S-W Super-Regenera-	
A 1-Tube	3	A Dual Regeneration Control Set	27	tor	54
Ham-Band "Pee-Wee" 3 Tuber	8	The "Wyeth All-Wave 6"	28	A Balanced-Detector Super-Regenerator	52
2-Tube All-Wave Receiver	8	Duo R.F. 4-Tube Receiver	29	The Short-Wave Superregenode	53
The Pentaflex	4	The "Beginner's Twin" Receiver	29	A 5-Tube A.C. Oscillodyne Set	50
A Good Short-Wave Receiver	7	An Advanced 5-Tube Receiver	30	The "Bear Cat—3" 5-Meter Super-Regen-	
The 2-Tube "Old Reliable"	7	The "RGH"—5 Receiver	31	erative Receiver	57
Duo-Amplidyne Receiver	5	The Original "Doerle" Set	31	A 5-Meter Super-Regenerator	58
The "19" Twinplex: 1 Tube Performs as	5	Doerle "Signal Gripper 3"	32	A German S-W Set	58
2	5	"19" Twinplex	33	A 4-Tube "5 and 10" Meter Receiver	
The "Mono-Coil 2"	9	4-Tube "Doerle" Set	33	With Optional Super-Regenerator	55
The Constant Band-Spread Twinplex	10	Doerle 3-Tube "Signal Gripper" Electri-	34	3 in 1 Monotube Super-Regenerator	56
The 2-Tube Pentaflex: 2 Tubes=4	10	fied	34	The Regenerative-Oscillodyne	51
The Pocket-Size Short-Wave Set	11	The "Clip-Coil Two" Rolls 'Em In!	35	The Oscillodyne	48
4000 Mile Reception on 3 Tubes	11	S-W Superheterodynes			
A DeLuxe T.R.F. Receiver	12	This 3-Tube "Super" Has "It"!	36	5-Meter "Bear-Cat" Receiver	48
A 3-Tube "Dx-er"	12	Short-Wave Thrills on 2 Tubes	37	Auto Tube Receiver	59
Denton "Stand-By" Electrified	13	Victor 2-Tube Superheterodyne	37	The A.C. Superregenode	59
An "All-Purpose" Receiver	13	A 4-Tube Super-Het	38	English Super-Regenerator Four	60
The Minidyne Works on "Loop"	14	The Denton S-W Plugless Superhetero-	39	A "Symmetrical Input" Super-Regenera-	
The "Pal" 2-Tube Portable	15	dyne	39	tor	61
The 2-Tube "Champ": 2 Tubes=3	16	The "Globe Girdler 7"	40	A 2-Volt, 3-Tube "Ham" Set	61
The Triplex 2: It Works Speaker!	16	The "Rex" Portable Super-Het	41	A.C.-D.C. Receivers	
2-Tube A.C.-D.C. Short-Wave Master	17	A South American 7-Tube Super-Het	42	The "Overseas" 1-Tube 110-220 Volt	
Picking Up Europe on a Loop	17	Mitchell 7-Tube Super-Het	43	A.C.-D.C. Receiver	62
New "Stand-By" Receiver	18	"Ultra Seven" Portable All-Wave Super-	44	4-Tube S-W "Space Explorer"	64
The Victor "Easy-Tune" 2-Tube Band-		Het	44	1-Tube "Baby-Radio" Set	64
Spreader	19	Super-Regenerative Receivers			
Modernized Meyers 3-Tube Set	19	The Short-Wave "Megadyne"	46	An A.C. S-W Converter	66
A 3-Tube Receiver of Quality	20	An Improved Super-Regenerator	46	A 2-Tube Portable "All-Wave" Receiver	66
Unifrol Simplifies Band-Spread	20	"Improved" 5-Meter Super-Regenerator	47	Transmitters	
The Electrodyne 1-Tube Set	21	The 5-Meter Super-Regenerator	47	5-Meter Transmitter and Receiver	68
2 R. F. Pentode S-W Set	22	The "53" 1-Tube Twinplex	49	5-Meter Pigmy Transmitter	70
The "RGH"—4 All-Wave	23	A Medium-Power Transmitter70			

A 1-Tuber



PARTS LIST

- 6—Fahnestock clips (1, 5, 14, 15, 17, 18, 19).
- 1—Pilot 4-prong socket for the plug-in coils.
- 1—Air-gap 4-prong socket for the type 30 detector tube (10).
- 1—Pilot 23-plate midget condenser (6).
- 1—Pilot 7-plate midget condenser (7).
- 1—Flechtheim midget condenser, .00025-mf. (8).
- 1—International Resistance Co. 3-megohm resistor (9).
- 1—Pacent 10-ohm rheostat (11).

- 1—Hammarlund equalizing condenser EC80 (2).
- 1—Alden Mfg. Co. set of short-wave coils (3, 4).
3 is the large winding and 4 is the small winding on all four coils.
- 1—Frost 100,000-ohm potentiometer with power switch (20, 12).
- 1—Aerovox mica condenser, .001 mf. (13).
- 1—Pair of good phones (16).
- 1—Wooden baseboard, 11 x 4½ x ½ inch thick.
- 1—Aluminum front panel, 6 x 11 x 1/16 inch thick.
- Wood screws solder, soldering lugs, wire, etc.
- 1—Type 30 tube (RCA).

DATA ON ALDEN PLUG-IN COILS

	Number of turns				
(1)	4¾	6 Pitch No. 22 D.S.C.	Primary	4 turns No. 31 D.S.C.	
(2)	10¾	12 Pitch No. 22 D.S.C.	Primary	6 turns No. 31 D.S.C.	
(3)	22¾	16 Pitch No. 22 D.S.C.	Primary	7 turns No. 31 D.S.C.	
(4)	51¾	40 Pitch No. 22 D.S.C.	Primary	15 turns No. 31 D.S.C.	
(5)	68¾	Close wound No 28 D.S.C.	Primary	28 turns No. 36 D.S.C.	
(6)	131¾	Bank wound, 2 layers, No. 32 (Optional Litz)	Primary	32 turns No. 36 D.S.C.	

WAVE BANDS:

- (1) Blue—10 to 20; (2) Red—20 to 40; (3) Yellow—40 to 80; (4) Green—80 to 200; (5) White—200 to 350; (6) Orange—350 to 550.

D.S.C.—double silk covered. Pitch—turns per inch

—Short Wave Craft, Nov. 1932.

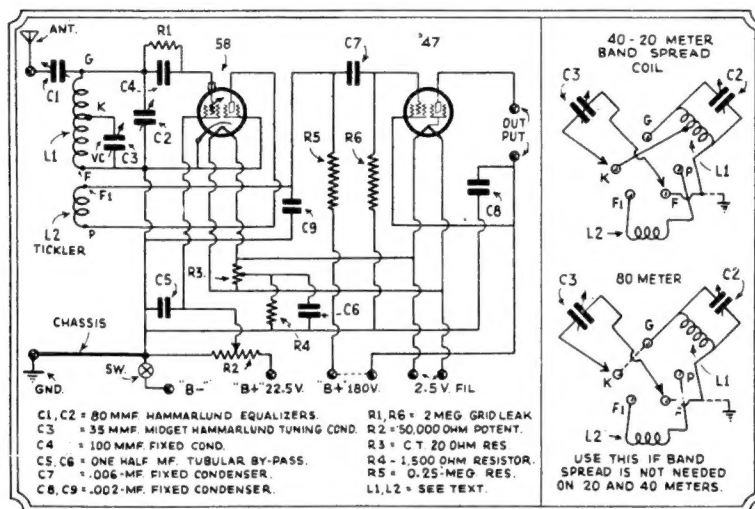
The diagram illustrates a vacuum tube radio receiver circuit, specifically designed for a 6X4 tube. The main circuit components include:

- Antenna Input:** Connected via ANT. to a variable capacitor (C1, 3-35 MMF.) and a coil (L1 = G TO F, L2 = P TO F1).
- Tuned Circuit:** Includes a second coil (L2, TICKLER, .3 MEG.) and a variable capacitor (C2, 140 MMF.).
- Detector Stage:** Utilizes a 6X4 tube with grid leak biasing (G1, G2, G3 & G5). Key components include capacitors C3 (.5-MF.), C4 (.01-MF.), C5 (.5-MF.), C6 (.0001-MF.), and C7 (.0005-MF.).
- Power Supply:** Features a D.P.S.T. SWITCH controlling two B+ lines: B+22.5V and B+180V.
- Output:** Connected to PHONES or a speaker.
- Resistors:** R1 (3 MEG.), R2 (400 OHMS), R3 (50,000 OHM POTEN.), R4 (.25-MEG.), and R5 (.25-MEG.).

An inset diagram provides a simplified view of the circuit, showing the essential components and their connections. It includes labels for the antenna, coils, capacitors, the 6X4 tube, resistors, and the power supply sections.

Short Wave Craft, Sept. 1933.

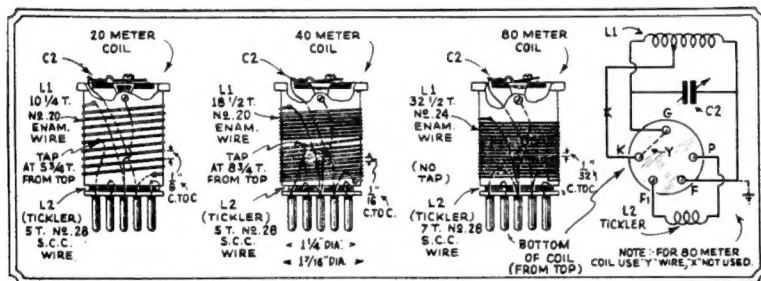
2-Tube A.C. Band-Spreader



List of Parts

- 1—Blan 7x6x9 inch shield box.
- 1—National type B dial.
- 1—Eby antenna and ground unit.
- 1—Eby phone tip unit.
- 1—Yaxley switch.
- 1—35 mmf. Hammarlund condenser.
- 1—50,000 ohm (Clarostat) potentiometer.
- 1—6 prong wafer socket Eby (Alden).
- 1—5 prong wafer socket Eby (Alden).
- 1—5 prong bakelite socket Eby (Alden).
- 4—80 mmf. Hammarlund equalizing condensers.
- 2—2 meg. grid leaks, Lynch.
- 1—250,000 ohm resistor, Lynch.
- 1—1500 ohm resistor, Lynch.
- 2—.002 mf. Aerovox condensers.
- 1—.006 mf. Aerovox condensers.
- 2—.5 mf. tubular Aerovox (Concourse) condensers.
- 3—5 prong coil forms (National or Silver Marshall).

—Short Wave Craft, Feb., 1933.



ANTENNA TO USE

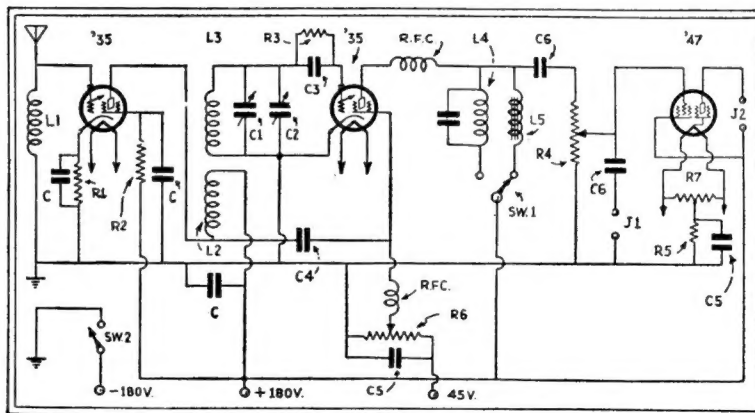
The antenna that was found best for this receiver was a long low wire. This type gives considerably less background noise. However, this receiver will pull in "foreign" stations with an antenna only ten feet long and the coupling condenser adjusted closer.

A Real 3-Tube Receiver

Constants of the Circuit

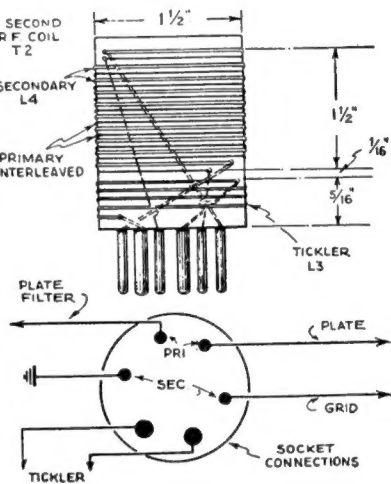
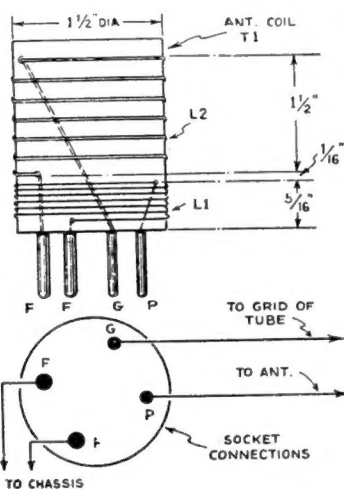
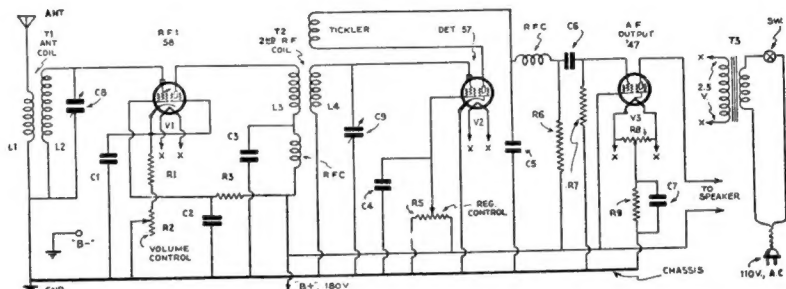
- C—0.006-mf. mica condenser.
- C1—3-plate midget condenser.
- C2—50-mmf. condenser.
- C3—100-mmf. mica condenser.
- C4—40-mmf. mica condenser.
- C5—1-mf. fixed condenser.
- C6—.01-mf. fixed condenser.
- R1—500-ohm, 1-watt resistor.
- R2—100,000-ohm 1-watt resistor.
- R3—5-megohm grid leak.
- R4—500,000-ohm potentiometer.
- R5—1,000-ohm, 1-watt resistor.
- R6—50,000-ohm potentiometer.
- R7—30-ohm center tap resistor.
- SW1—Single-pole double-throw switch.
- SW2—Single-pole single-throw switch.
- L4—Aero Hi-Peak.
- L5—National S-101 coupler.

—Short Wave Craft, Oct., 1932.



List of Parts

- 1—set of 6 prong det. coils.
- 1—set of antenna coils.
- 1—Filament transformer, 2½ inches high, with a 2.5-volt secondary, T3.
- 1—5,000-ohm volume control, R2.
- 1—Frost 100,000-ohm potentiometer, R5.
- 2—Acratest 600-ohm resistors, 1-watt, R1, R9.
- 3—1. R. C. .1-meg. resistors, 1-watt, R3, R4, R6.
- 1—I. R. C. .5-meg resistor, 1-watt, R7.
- 1—20-ohm center-tapped resistor, R8.
- 1—Acratest .006-mf. condenser, C1.
- 1—Acratest .02-mf. condenser, C2.
- 1—Acratest .1-mf. condenser, C3.
- 1—Acratest .1-mf. condenser, C4.
- 1—Micamold .001-mf. condenser, C5.
- 1—Sprague .03-mf. condenser C6.
- 1—Acratest 25-mf. dry electrolytic condenser, C7.
- 1—Hammarlund two-gang "tuning" condenser, type MCD-140M, 140-mmf., C8, C9.
- 2—R.F. chokes, 100 turns No. 38 enameled wire on a spool ¼-inch in diameter and ¼-inch long.
- 1—Special panel and chassis by Blan-the-radio-Man.
- 2—Special tube shields by Blan-the-Radio-Man.
- 1—Eby antenna and ground strip.
- 1—Eby loud speaker strip.
- 2—Eby 6-prong sockets.
- 1—Eby 5-prong socket.
- 1—Eby 4-prong socket.
- 1—Hammarlund 4-prong isolantite socket, type S-4, for T1.
- 1—Hammarlund 6-prong isolantite socket, type S-6, for T2.
- 1—Three-wire cable.
- 1—Power cable with plug.
- 1—National type N, 0-100 vernier dial.
- 1—Best or Magnavox "magnetic" loud speaker.



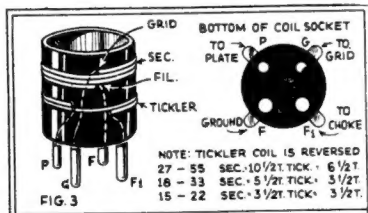
An interesting feature of this regeneration control is the fact that as regenera-

tion is advanced or retarded, the tuning of the receiver does not change to an appreciable extent.

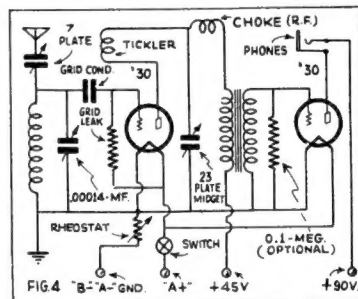
—*Short Wave Craft, Sept., 1932.*

The 2 Tube "Old-Reliable"

- 1—Weavever cooky sheet 12x15½"
- 1—dial, 4 inch.
- 2—knobs.
- 1—filament switch.
- 1—single circuit jack.
- 1—Pilot (Hammarlund) 23 plate midget (Cap. .0001 mf.).
- 1—Pilot (Hammarlund) 7 plate midget (Cap. .000025 mf.).
- 1—tuning condenser 7 plate .00014 mf. (Hammarlund).
- 1—Sub-base transformer Stromberg Carlson 4-1; a 6-1 size will result in more volume.
- 2—wafer sockets (Na-ald).
- 1—Pilot socket (Na-ald).
- 1—Grid condenser .0001 mf. Aerovox (Polymet).
- 1—5 megohm grid-leak Aerovox (Polymet).
- 1—5 megohm grid-leak Aerovox (Lynch).
- 4—fibre washers.



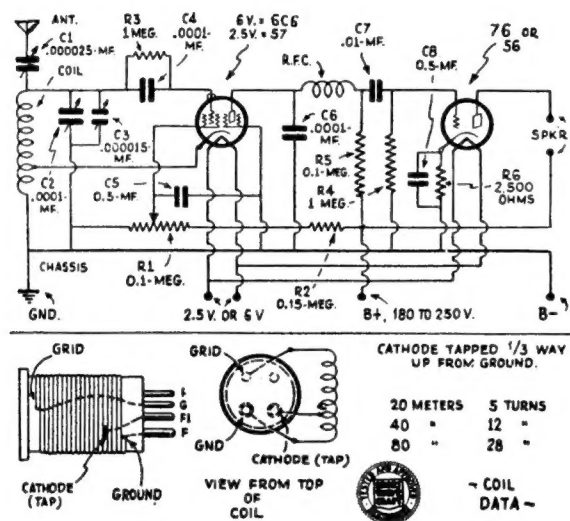
- 3—tube bases, some No. 18 wire plus hook-up wire.
- 1½ dozen nickel brass screws (not steel).
- 1—pair of good phones large size Brandes 2000 ohms.
- 2—type 30 tubes.
- 2—"B" batteries 45 volt.
- 1—"A" battery.
- 1—Antenna system.



- 1—ground.
Coil data (see drawing)

—Short Wave Craft, March, 1933.

Ham-Band "Pee-Wee" 3 Tuber



Parts List

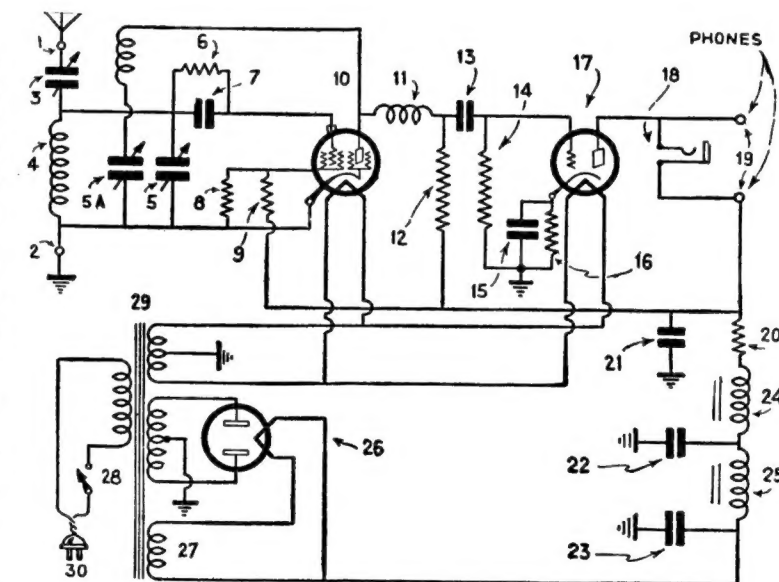
- C1-1—.000025 mf. variable midget condenser.
- C2-1—.0001 mf. variable midget condenser.
- C3-1—.000015 mf. variable (cut down 3-plate unit).
- C4, C6—.0001 mf. fixed mica condenser.
- C5, C8—.5 mf.-250 volt bypass (paper).
- C7-1—.01 mf. bypass condenser.
- R1-1—100,000 ohm potentiometer; Acratest.
- R2-1—150,000 ohm, 1 watt carbon resistor, Lynch.
- R3, R4—1 meg., 1 watt carbon resistor.
- R5-1—100,000 ohm, 1 watt carbon resistor.
- R6-1—2500 ohm, 1 watt carbon resistor.
- RFC—Radio frequency choke, 30 to 85 milihenry. Hammarlund or National.
- 1—6-prong socket, Eby (Na-ald, Hammarlund, National).
- 1—5-prong socket, Eby (Na-ald, Hammarlund, National).
- 1—4-prong power supply socket, Eby (Na-ald, Hammarlund, National).

—Short Wave Craft, Nov., 1933.

2-Tube All-Wave Receiver

Parts List

- 1—Eby antenna-ground strip (1, 2).
- 1—Hammarlund equalizing condenser (3).
- 1—set Octo-Coils (4). (Ranges: 16-30, 29-58, 54-105, 100-200, 200-510 meters. See Page 5 "19 Twinplex" set, for coil winding data; the broadcast coil has a secondary of 126 turns of No. 28 enameled wire on a 1 1/2-inch diameter tube. The tickler has 28 turns No. 34 enameled wire.)
- 2—Pilot midget condensers, .00015 mf. each (5A, 5).
- 1—Acratest .5-watt, 3-meg. resistor (6).
- 1—Micamold mica condenser, .00015 mf. (7).
- 1—Acratest resistor, 7,500 ohms, .5 watt (8).
- 1—Acratest resistor, 500,000 ohms, .5 watt (9).
- 1—Eby 6-prong tube socket (10).
- 1—Blan short-wave R.F. choke (11).
- 1—International resistor, 200,000 ohms, 1 watt (12).
- 1—Sprague condenser, .075 mf. (13).
- 1—International resistor, 1 meg., 1 watt (14).
- 1—Acratest dry electrolytic condenser, 1 mf., 200 volts, No. 6662 (15).
- 1—International resistor, 1 watt, 2,500 ohms (16).
- 1—Eby 5-prong socket (17).
- 1—Frost short jack (18).
- 1—Eby phone jack (19).
- 1—Acratest resistor, 5 watt, 25,000 ohms (20).
- 3—Acratest electrolytic condensers, one 4 mf. and two 8 mf., No. 6493 and 6495 (21, 22, 23).
- 2—Acratest chokes, 30-henry, No. 2505 (24, 25).
- 1—Eby 4-prong socket, marked 280 (26).

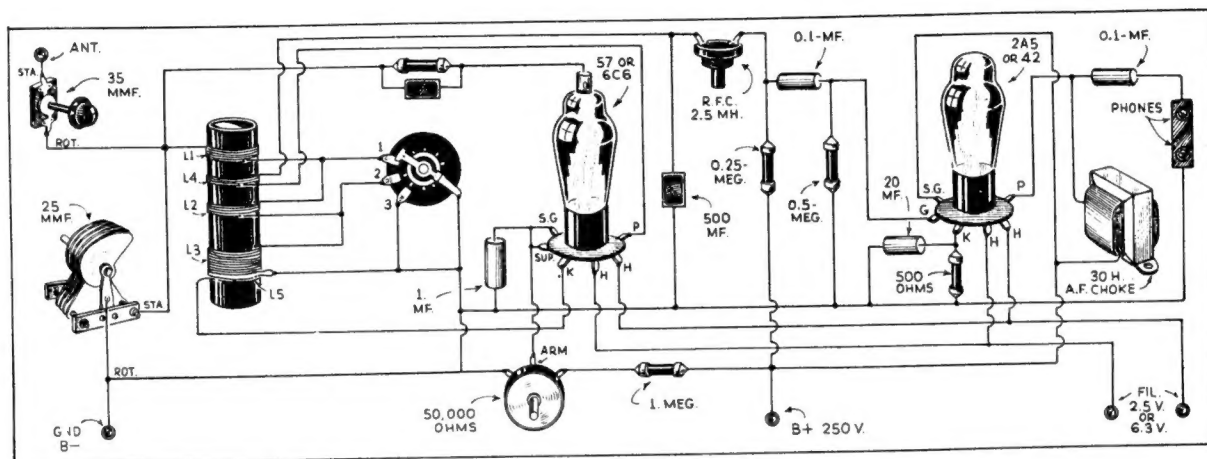


- 1—Acratest power transformer, No. 6027 (27).
- 1—H. & H. filament switch, No. 4122 (28).
- 1—G. E. power cable and plug (30).
- 1—Micamold condenser, .005 mf. (29).
- 1—Blan aluminum chassis, folded and drilled.

- 1—K. K. port dial.
- 1—National screen-grid clip.
- 1—Raytheon '80 tube.
- 1—Raytheon '56 tube.
- 1—Raytheon '57 tube.

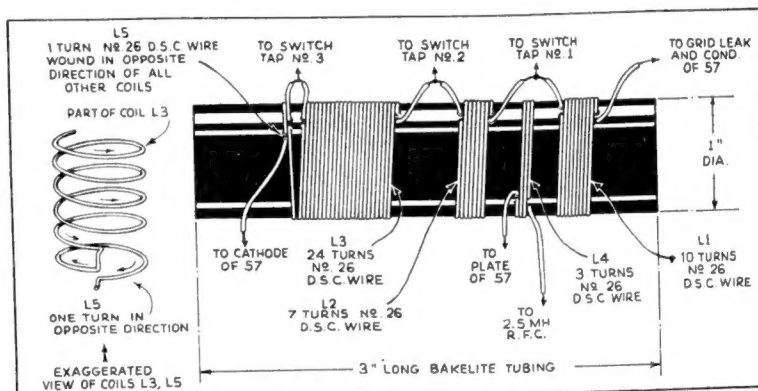
—Short Wave Craft, Sept., 1932.

The "Mono-Coil 2"



NO MORE PLUG-IN COILS!

The "plug-in" coil has been a sore spot in the realm of short-wave receivers for a long time — at last this great "bugaboo" of pulling out and pushing in short-wave coils has been wiped out by a single stroke of masterly genius — thanks to the extensive researches of George W. Shuart, who here describes the "Mono-Coil," which permits changing of bands even more efficiently than by the use of plug-in coils! Only one very simple single-pole switch is required for changing the bands with the "Mono-Coil".



Constructional details of the "Mono-Coil"

Here is a real solution to the problem of "how to eliminate plug-in coils." The "Mono-Coil 2" is a 2-tube receiver which will cost only a nominal amount to build; it covers the short-wave "broadcast" bands, 19-25, 25-38, and the 49 meter channels by merely turning a switch. The benefits of "band-spread" are included! Uses 2.5 Vt. or 6.3 Vt. tubes.

When the switch is set on contact No. 3 the entire grid coil is in use with the three-turn plate tickler and the one-turn cathode coil providing just the proper amount of feed-back when the screen voltage of the tube is set for maximum sensitivity. Set on point No. 2 the switch shorts out L3, the cathode coil now becomes more or less inactive, which is just what we want. The plate coil is then left

to work with L1 and L2. The range of each tap of the coil is of course affected by the adjustment of the antenna condenser but their approximate tuning range is as follows: tap-1, 16 to 28 meters, tap-2, 25 to 38 meters and tap-3, 45 to 55 meters. The drawing clearly shows the construction of the coil and the number of turns. For best results follow the specifications exactly.

List of Parts for "Mono-Coil-2"

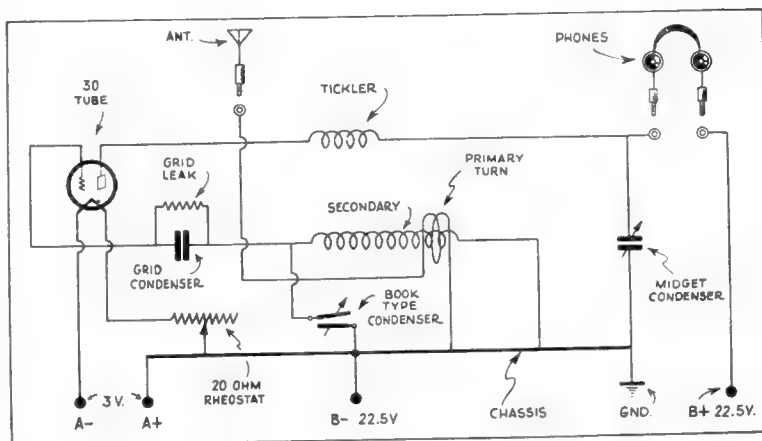
- 1—Chassis 5"x8"x1". Blan.
- 1—Panel 7"x9". Blan.
- 1—Mono-Coil—see drawing.
- 1—4 pt. single pole switch. Blan.
- 1—35 mmf. Var. Antenna condenser.
- 1—25 mmf. condenser; tuning 270 degrees. National.
- 1—.0001 mmf. fixed condenser (mica).

- 1—1 mf. (paper).
- 1—.0005 mf. fixed (mica).
- 2—.1 fixed (paper).
- 1—20 mf. 25 volts (electrolytic).
- 1—3 meg. resistor (½ watt). Lynch.
- 1—¼ meg. (½ watt). Lpnch.
- 1—½ meg. (½ watt). Lynch.
- 1—1 meg. (½ watt). Lynch.
- 1—500 ohms 1 watt.
- 1—50,000 ohm potentiometer Acra-test.
- 1—J30 H. midget choke (iron core).
- 2—6 prong sockets. Na-Ald.
- 1—Antenna ground terminal strip. Na-Ald.
- 1—Phone terminal strip. Na-Ald.
- 1—57 or 6C6 tube. RCA Radiotron. (Ar-co).
- 1—2A5 or 42 tube. RCA Radiotron. (Ar-co).

—Short Wave Craft, Aug., 1934.

A Pocket Sized Short-Wave Set

This very cleverly designed pocket short-wave receiver, originally described in the October, 1933 issue of *SHORT WAVE CRAFT* employs but one tube, which may be of the 30 type. This tube may be operated on a flashlight battery or a "C" battery for the filament, while the plate supply of 22½ volts potential may be furnished by flashlight cells, fountain-pen flashlight cells, etc. Instead of using the tuning coil shown, together with book-type tuning condenser, regular standard plug-in coils, data for which will be found elsewhere in this book, may be used in conjunction with a regular rotary variable tuning condenser of the midget type and having a capacity of .00014 mf. Coil data is given below which is useful where a tuning condenser of .0001 mf. or 100 mmf. is to be used. The grid leak for the portable pocket set is of 9 to 10 megohms resistance, and the grid condenser of 250 mmf. capacity. The regeneration control condenser connected between the ground and one of the phone terminals may be a midget 13 plate unit having about 50 mmf. capacity. If the set does not seem to regenerate use a larger condenser and the editor recommends at least a 140 mmf. as the size generally used for this purpose.



Coil data for .00009 mf. (approximately .0001 mf.)

P.	S.	T.	Wave Length Range in Meters
38T. No. 32	63	T. No. 28	200-115 m
22T. No. 34	35	T. No. 24	115-65 m
13T. No. 34	20	T. No. 18	70-40 m
8T. No. 34	12	T. No. 18	41-23 m
4T. No. 34	6½	T. No. 16	25-14.5 m
2T. No. 34	3	T. No. 16	15-9 m

Dia. form 1½", 6 pin.

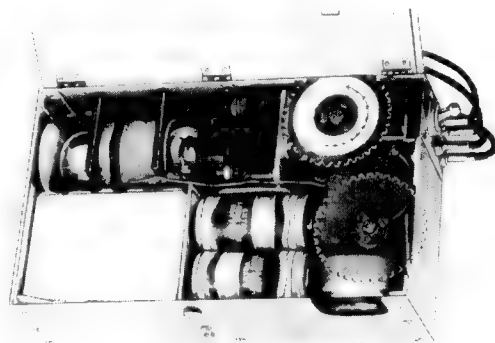
T=tickler.

S=secondary or grid coil.

P=primary or antenna coil.

—*Short Wave Craft*, Oct., 1933.

Right—A photo of the completed pocket-size receiver showing the interior. Note that all batteries are self-contained in the metal cabinet.

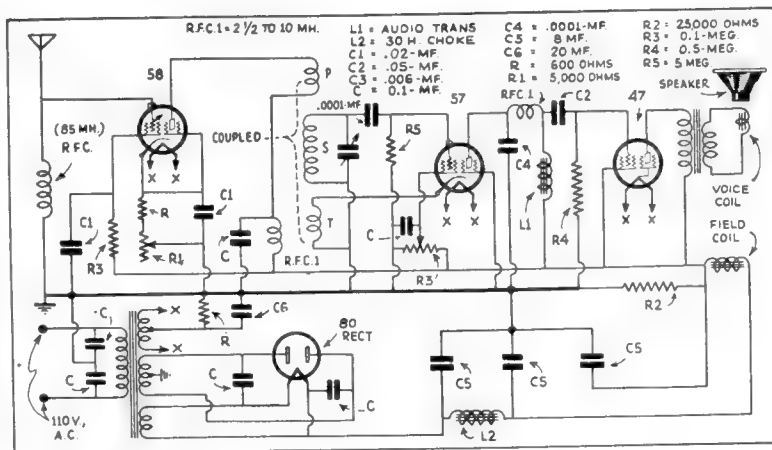


4000 Mile Reception On 3 Tubes

This fine receiver was constructed by a resident of the Dominican Republic in the West Indies. Using a four-foot wire for an aerial, it pulled in Daventry, England at full loud-speaker strength.

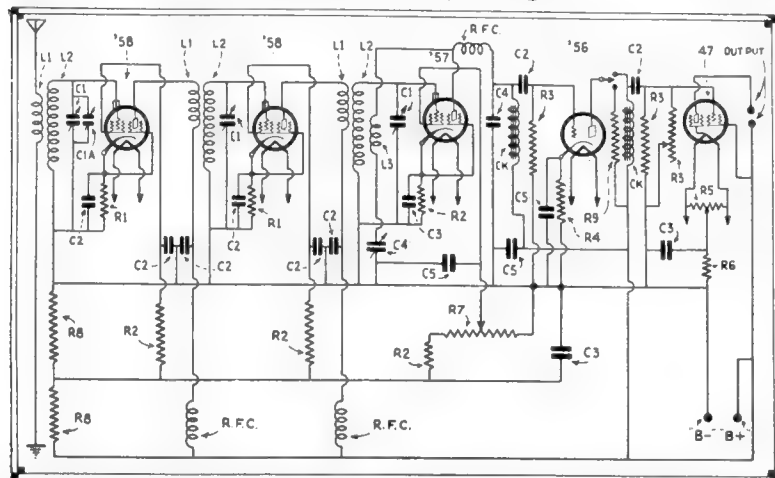
An electron coupled regenerative detector is employed, resulting in excellent stability. All plug-in coils were mounted on the chassis of the receiver and a switching arrangement is employed to change the wavelength. The plug-in coils used were ordinary three-winding 6-pin type coils such as those of the National Company. The detector tuning condenser has a value of 160 mmf. The set is "all-electric." The suppressor grid of the detector, it should be noted, is connected directly to ground, rather than to the cathode of the tube. The impedance, L1, in the plate circuit of the detector tube consists of an audio transformer with the primary and secondary connected in series. The "G" terminal of the secondary of this transformer was connected to the R.F. choke L1, and "P" and "F" were tied together. "F" connects to the plate voltage supply.

—*Short Wave Craft*, Aug., 1933



A De Luxe T.R.F. Receiver

With the modern high-mu tubes now available one of the most interesting types of receivers is the T. R. F. or tuned radio frequency design.



Here's the diagrams, boys, showing just how the "5 T.R.F." short-wave receiver job is hooked up. Two "high duty" R.F. amplifier stages build up the weak signals and feed them to the detector. Note the clever audio stage design.

Coil Winding Data

FOR AMATEUR USE

7 PLATE TUNING CONDENSER

	Ant. L1	Sec. L2	Tick L3
14,000 KC	3	8	5
7,000 KC	4	15	7
3,500 KC	7	31	11

GENERAL SHORT WAVE USE 23 PLATE TUNING CONDENSER

	Ant. L1	Sec. L2	Tick L3
20,000—9650 KC	2	5	4
9700—4700 KC	3	11	6
4800—2500 KC	6	21	9

Use No. 22 D. S. C. on secondaries.

Use No. 28 D. S. C. on primaries and Tickler.

Spacing between windows 3/16".

Parts for Receiver

- C1—.0001 mf. Tuning condenser.
- Cla—2 Plate midget ant. compensator.
- C2—.02 mfd. condenser.
- C3—1 mf. condenser.
- C4—.0001 mf. condenser.
- C5—.5 mf. condenser.
- R1—400 ohm resistor.
- R2—10,000 ohm resistor.
- R3—.5 meg. resistor.
- R4—2000 ohm resistor (heavy duty type).
- R5—20 ohm center tap resistor.
- R6—360 ohm resistor (heavy duty).
- R7—50,000 ohm resistor.
- R8—25,000 ohm resistor (heavy duty).
- R9—25,000 ohm resistor.

—Short Wave Craft, Jan., 1933.

A 3-Tube "Dx-er"

Coil Data

L1	L2	L3	L4	
16	32	32	18	100-200 Meters
10	15	15	8	50-100 Meters
6	7	7	5	28-60 Meters
5	4	4	5	13-30 Meters

Parts List for 3-Tube DX'er

One aluminum bent and drilled base. (Blan.)

3—Subpanel sockets, (two six, one five prong). (Na-Ald)

2—Na-Ald Universal mount sockets (For raising coils).

1—75,000 Ohm potentiometer, (Centralab) (Clarostat).

1—5 plate vernier midget (Pilot or Hammarlund).

1—Two gang .00015 mf. tuning condenser.

4—.1 mf. bypassing condensers (Aerovox).

3—Radio Frequency chokes (Home-made or bought).

1—400 Ohm bias resistor (Lynch).

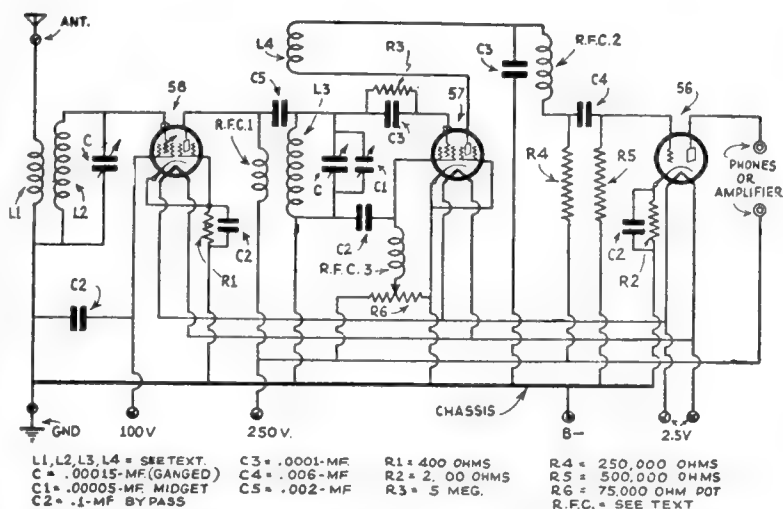
1—2000 Ohm bias resistor (Lynch).

1—.0001 mf. Grid condenser (Aerovox) (Polymet).

1—.0001 mf. Regeneration condenser (Hammarlund).

1—.002 mf. coupling condenser (Micamold) (Polymet).

1—.006 mf. coupling condenser (Sprague) (Polymet).



- L1, L2, L3, L4 = SEE TEXT.
- C = .00015-MF (GANGED)
- C1 = .00005-MF MIDGET
- C2 = .1-MF BYPASS
- C3 = .0001-MF
- C4 = .006-MF
- C5 = .002-MF
- R1 = 400 OHMS
- R2 = 2.00 OHMS
- R3 = 5 MEG.
- R4 = 250,000 OHMS
- R5 = 500,000 OHMS
- R6 = 75,000 OHM POT
- R.F.C. = SEE TEXT
- 1—250,000 Ohm det. plate resistor (Lynch).
- 1—500,000 Ohm grid resistor (Lynch).
- 1—phone plug.
- 1—ant.-gnd. post.
- 1—58, 1-57, 1-56 tube.

Two Tru-test (or other) tube shields.
1—vernier dial (preferably Pilot "Art").
Volume control and vernier knobs.

—Short Wave Craft, May, 1933.

The "Stand-By" Electrified

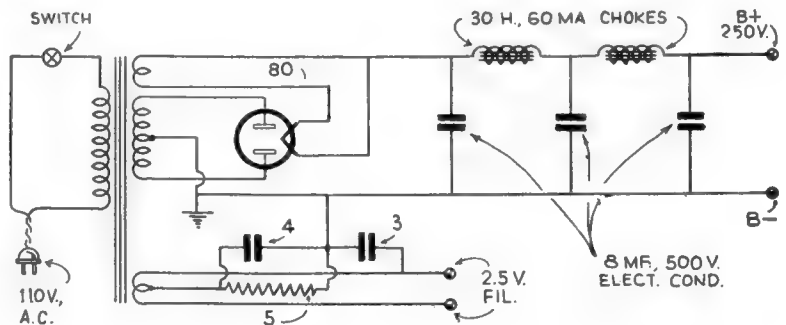
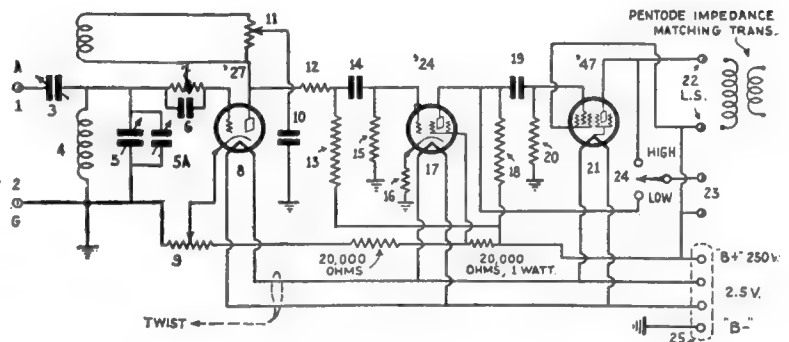
Parts List (Power Supply)

- 1—Acratest No. 6027 power transformer.
- 2—Eby socket, '80 type.
- 3—Mica-mold .005 m.f. condenser.
- 4—400-ohm, 5-watt resistor, Acratest.
- 5—25 mf. 25-volt dry electrolytic condenser.
- 6, 7—30-henry choke No. 2505 (Acratest).
- 8—8 mf. dry electrolytic condenser, Acratest.
- 9—8 mf. dry electrolytic condenser, Acratest.
- 10—8 mf. dry electrolytic condenser, Acratest.
- 11, 12, 13, 14—4-wire cable and plug connecting to chassis at 25.
- 15—Filament switch on "Stand-by" Receiver.

Parts List for Denton "Stand-by" Receiver

- 1—set of Octo coils (4).
- 1—XL variometer (3).
- 1—Eby '37 type wafer socket (8).
- 1—Eby '36 type wafer socket (17).
- 1—Eby '38 type wafer socket (21).
- 1—Eby antenna ground B, postrip (1, 2).
- 1—Eby dial phone tip connector (23).
- 1—Eby L.S. tip connector (22).
- 1—G.E. power toggle switch (18).
- 1—S.P.P.T.—toggle switch (24).
- 1—Frost 50,000 ohm potentiometer (1) with insulated washers.
- 1—Carter 200-ohm potentiometer (9) with insulated washers.
- 1—Pilot midget condenser (5A) (J5).
- 1—Pilot ART dial.
- 2—International Durham $\frac{1}{2}$ -watt, 0.25-meg. resistors (18, 20).
- 1—International Durham $\frac{1}{2}$ watt .5 meg. resistor (15).
- 1—International Durham 1-watt, 25-meg. resistor (13).
- 1—1-watt, 10,000-ohm resistor (12).
- 1—1-watt, 3,000-ohm resistor (16).
- 2—Dubilier .01-mf. mica condensers (14, 19).
- 1—Eby 5-contact wafer male connector unit (25) with female receptacle and wire cable.
- 1—.001-mf. mica Aerovox condenser (10).
- 1—.000125-mf. mica Illini grid condenser (6).
- 1—5-meg. International Durham grid leak (7).
- 1—National .0005-mf. condenser cut down to .00015-mf. (5).
- 1—"Blan" aluminum box and chassis cut and drilled to specifications, with special coil cover "cap" and bakelite coil mounting assembly.
- 12—Insulated eyelets.
- 2—Grid grip screen-grid clips.
- 15 feet rubber-covered (push-back) wire, nuts, bolts, lockwashers, soldering lugs, etc.

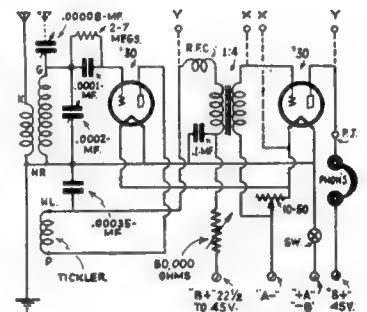
—Short Wave Craft, June, 1932.



An All Purpose Receiver

List of Parts

- 1—.0002 mf. Hammarlund Midget variable condenser.
- 1—.0001 mf. Sangamo fixed condenser with clips.
- 1—Grid-leak two to seven megohms.
- 1—.00035 mf. fixed regeneration by-pass condenser.
- 1—.01 mf. by-pass condenser.
- 1—80 mmf. Hammarlund "equalizer" condenser.
- 1—50,000 to 100,000 ohm Centralab variable resistor (Clarostat).
- 1—10 to 50 ohm filament rheostat.
- 1—short-wave R.F. choke.
- 1—Hedgehog audio transformer (1 to 4 ratio).
- 1—Pilot five-prong socket (or Na-ald).
- 2—Pilot four-prong sockets (or Na-ald).
- 4—Pilot five-prong plug-in coil forms (Gen-Win).
- 1—Bud five-prong plug-in coil form (Gen-Win).
- 1—Five-prong tube base.
- 1—5"x6 $\frac{1}{2}$ " bakelite panel.
- 1—Wooden cabinet 5"x6 $\frac{1}{2}$ "x2 $\frac{1}{2}$ " (inside dimensions).
- 1—Wafer adaptor (grid to filament).
- 1—3" dial for tuning condenser.



- 2—knobs for rheostat and regeneration control.
 - 1—Flashlight bulb and socket.
 - 1—Phone tip and jack.
 - 1—Small battery clip.
 - 2—10 to 15 mh. R.F. chokes.
 - 2—Fahnestock clips.
- Tubes, batteries, hook-up wire, and hardware wind up the list of parts. Standard coils are used.

—Short Wave Craft, April, 1933.

The "Pal" 2-Tube Portable

Complete List of Parts Required

- 1—Hammarlund Dual Midget Condenser, .00014 mfd. per section, type MCD-140-M (3, 15).
- 1—75,000 ohm Volume Control Potentiometer, type RI-202-P (10) with switch (31).
- 1—400 ohm, 50 watt Wire Wound Resistor, type C-4, with sliding clip set at 340 ohms (30).
- 1—Set of Alden Plug-in Coils—four coils to set—covering short wave band from 15 to 200 meters, type 704 SWS (2).
- 1—Alden Plug-in Coil Covering Broadcast band, type 704 SWO (2).
- 1—Set of Alden Plug-in Coils, type 705 SWS, with primary changed as explained below (16).
- 1—Plug-in Coil, type 704SWO with primary changed as explained below (16).
- 1—Mica Condenser, .00005 mfd. (13).
- 4—Mica Condensers, .0001 mfd. (4, 6, 7, 18).
- 2—Cartridge Condensers, .006 mf. (1, 26).
- 2—Cartridge Condensers, .01 mf. (11, 20).
- 1—Cartridge Condenser, .1 mf. (14).
- 1—Electrolytic Cartridge Condenser, 4 mf., 150 volt (28).
- 2—Electrolytic Condensers, Cardboard Container, 4 mfd. (17, 29).
- 1—Cartridge Electrolytic Condenser, 10 mfd., 25 volt (22).
- 1—I. R. C. 1000 ohm, $\frac{1}{2}$ watt Metallized Resistor, type F $\frac{1}{2}$ (23).
- 2—I. R. C. 5000 ohm, $\frac{1}{2}$ watt Metallized Resistors, type F $\frac{1}{2}$ (14-A, 25).
- 3—I. R. C. 50,000 ohm $\frac{1}{2}$ watt Metallized Resistors, type F $\frac{1}{2}$ (1, 12, 13-A).
- 1—I. R. C. 100,000 ohm, $\frac{1}{2}$ watt Metallized Resistor, type F $\frac{1}{2}$ (19).
- 1—I. R. C. 200,000 ohm, $\frac{1}{2}$ watt Resistor, type F $\frac{1}{2}$ (21).
- 1—I. R. C. 1 meg., $\frac{1}{2}$ watt Metallized Resistor, type F $\frac{1}{2}$ (8).
- 2—Alden Seven-Prong Molded Sockets, type 437-A (5, 24).
- 1—Lafayette 6F7 Tube (5).
- 2—Alden 4-Prong Molded Sockets (2, 16).
- 1—Lafayette 12A7 Tube (24).
- 1—Lafayette Magnetic Speaker, Small Size (27).
- 1—Roll Hook-up Wire, Solid Core.
- 1—Drilled Metal Chassis $9\frac{1}{4}'' \times 4\frac{1}{4}'' \times 1\frac{1}{4}''$ high; Blan.
- 1—Noise Eliminating Aerial Lead-in System; Lynch.

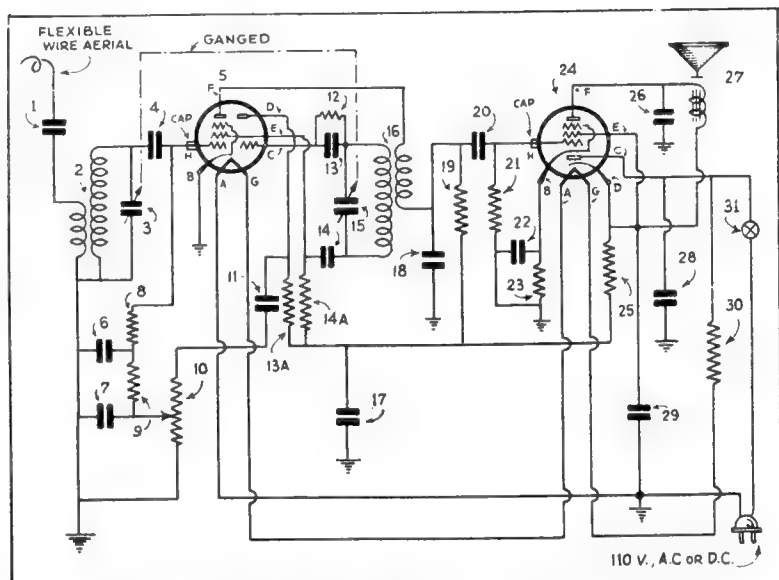
(Numbers in parentheses refer to corresponding numbers on diagram.)

Alden 4-Pin Plug-in Coil Data

Meters Wave-length	Grid coil turns	Ticker turns	Distance between 2 coils
200-80	52 T. No. 28 En. Wound	19 T. No. 30 En. Close wound (CW)	$\frac{1}{8}''$
80-40	32 T. per inch	23 T. No. 28 En. C. W.	$\frac{1}{4}''$
40-20	16 T. per inch	11 T. No. 30 En. C. W.	$\frac{1}{2}''$
20-10	5 T. No. 28 En. turns	7 T. No. 30 En. turns	$\frac{1}{4}''$

Coil form— $2\frac{1}{2}''$ long by $1\frac{1}{4}''$ dia. 4-pin base.

Before it can be used at (16), the standard Alden four-prong coil must be altered as follows: First remove the small wind-



ing on the bottom of the form. Then wind an interwinding between the turns of the secondary. The number of turns should equal two-thirds of the particular coil being changed. Number 34 to 36 enamelled wire should be used. The new winding should be connected to the prongs in place of the one which was removed.

Using only two tubes to obtain loud speaker operation, the new "Pal" Portable represents a distinct innovation in receiver design. In this set, the trend towards compactness and simplification has been followed to its logical conclusion. Each one of the tubes used possesses the ability to perform several different functions.

The 6F7 tube consists of two separate units, one a pentode and the other a triode. The pentode unit serves as the first r.f. tube, while the triode unit is used as the detector. By means of a reflex circuit, the pentode unit is again utilized—this time as a first audio tube.

The 12A7 tube combines the functions of a power output pentode and a rectifier unit. As in the case of the 6F7 tube, the two units are both mounted within the

same envelope. There is a separate 6.3 volt heater for each unit, the heaters being connected in series internally. Hence, this tube has a rated heater voltage of 12.6 volts.

It can thus be seen that these two tubes are made to perform the same functions which would ordinarily call for the use of five separate tubes.

The "Pal" gives loud speaker operation with only two tubes. Local stations come in at "room" volume, using only an indoor aerial. Two of the newest tubes, the 6F7 and the 12A7 are used in the unique circuit whereby the 6F7 functions as a r.f. stage, while the 12A7 acts as a second audio (output) stage and a rectifier. The utilization of the "Cisin" A.C.-D.C. circuit permits operation on any house lighting circuit without changes in tubes or wiring. While the present design is that of a standard "sub-midget", this receiver may be built up in such compact size that it will fit into a coat pocket! Alden plug-in coils enable this set to bring in short wave and broadcast stations. Both coils are tuned by a compact dual Hammarlund variable condenser.

—Short Wave Craft, March, 1934.

The MINIDYNE

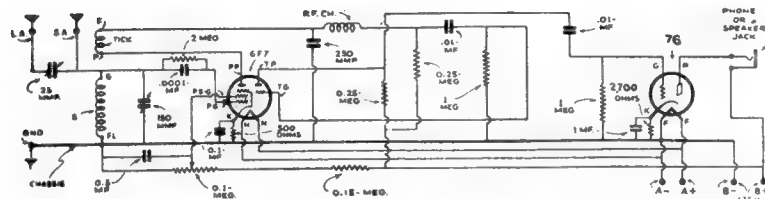
(Continued from last page)

- 1—Set of 2 pin jacks.
- 1—200,000 ohm potentiometer, Acratest.
- 1—1.5 megohm grid leak, Lynch, (International).
- 1—.00025 mf. condenser.
- 2—.006 mf. condensers.
- 1—.01 mf. condenser.
- 1—50 mmf. variable condenser, Hammarlund, (National).

- 1—2-gang single-pole, double-throw switch, Eby.
- 1—4 prong tube socket, Eby, (National, Hammarlund, National).
- 1—30 type tube; Gold-Seal, (Arco, Van Dyke).
- 1—22½ volt small "B" battery unit.
- 2—1½ volt flash light cells for "A" battery.

—Short Wave Craft, Oct., 1933.

The 2-Tube "Champ": 2 tubes=3



Parts List

- 1—National Dial type B.
- 1—National R.F. Choke 2.5 M.H.
- 1—National Tuning condenser type SE-100 (100 mmf.).
- 1—National .000025 mf. Variable condenser.
- 1—.0001 mf. condenser.

- 1—.00025 mf. condenser.
- 2—.01 mf. condenser.
- 1—.1 mf. condenser.
- 1—.5 mf. condenser.
- 1—2 megohm resistor Lynch.
- 2—1 megohm resistor Lynch.
- 1—150,000 ohm resistor Lynch.
- 1—100,000 ohm resistor Lynch.
- 1—250,000 ohm resistor Lynch.

- 1—1,500 ohm resistor Lynch.
- 1—37 type socket.
- 1—6F7 type socket.
- 1—UX blank socket.
- 1—500 ohm resistor Lynch.
- 1—100,000 ohm potentiometer; Acra-test.
- 1—chassis 7x4x2.
- 1—panel 7x6 1/2.

Data for Winding Coils

Range in meters	Grid—size wire	Plate—size wire
14 to 22	6 turns 26 D.C.C.	6 turns 26 D.C.C.
20 to 40	12 turns 26 D.C.C.	8 turns 26 D.C.C.
40 to 80	25 turns 26 D.C.C.	12 turns 26 D.C.C.
80 to 200	45 turns 30 D.S.C.	15 turns 30 D.S.C.

Leave 3-16 inch space between grid and tickler coils. Dimensions of coil forms—1 1/2 inch long by 1 inch in diameter; National 4-pin, special low-loss R-39 insulation forms.

—Short Wave Craft, Jan., 1934.

The Triplex 2: It Works Speaker!

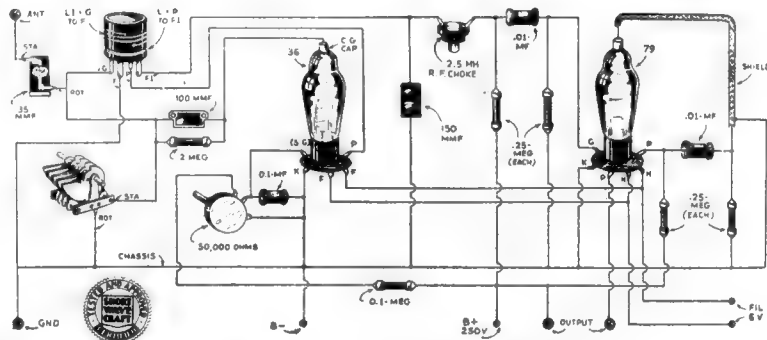
Alden 4-Pin Plug-In Coil Data

Meters Wave-length	Grid coil turns	Tickler turns	Distance between 2 coils
200-80	52 T. No. 28 En. Wound	19 T. No. 30 En. Close wound (CW)	1/8"
80-40	32 T. per inch Wound	11 T. No. 30 En. C. W.	1/8"
40-20	16 T. per inch Wound	9 T. No. 30 En. C. W.	1/8"
20-10	5 T. No. 28 En. Wound	7 T. No. 30 En. C. W.	1/8"

Coil form—2 1/4" long by 1 1/4" dia. 4-pin base.

Parts List for Triplex

- 1—.00014 or .00015 mf. tuning condenser. National (Hammarlund; Cardwell).
- 1—50,000 ohm potentiometer. Acra-test.
- 1—15 to 200 meter coil and switch assembly.
- 1—6-prong wafer socket. Na-ald.
- 1—5-prong wafer socket. Na-ald.
- 4—binding posts.
- 1—35 mmf. antenna trimmer condenser. National (Hammarlund).
- 1—.0001 mf. mica condenser.
- 3—.01 mf. by-pass condensers.
- 1—.00015 mf. mica condenser.
- 1—100,000 ohm (1 watt) resistor. Lynch.
- 2—250,000 ohm (1 watt) resistor. Lynch.
- 2—250,000 ohm (1/2 watt) resistor. Lynch.
- 1—2 meg. (1/2 watt) resistor. Lynch.
- 1—drilled metal chassis. Try-Mo Radio.



- 1—National Vernier dial (small).
- 1—36 tube RCA Radiotron Co. (Arco).
- 1—79 tube RCA Radiotron Co. (Arco).

The output of the 36 works into a 250,000 ohm load resistor (a high impedance choke could be used here to provide higher audio output) and is coupled to an audio stage through a .01 mf. condenser. The first audio tube is the triode of the 79, having its grid at the base of the tube; the triode with its grid at the top of the envelope is the second stage.

A 250,000 ohm resistor is used for the grid leak of the first audio tube, and proved to be the optimum value; higher values gave greater gain but resulted in less stable operation, which resulted in inferior tone quality. The plate load resistor for the first audio stage which gave the best results was 250,000 ohms.

A lower value in this position gave no greater gain and again instability was the result. The grid coupling condenser and

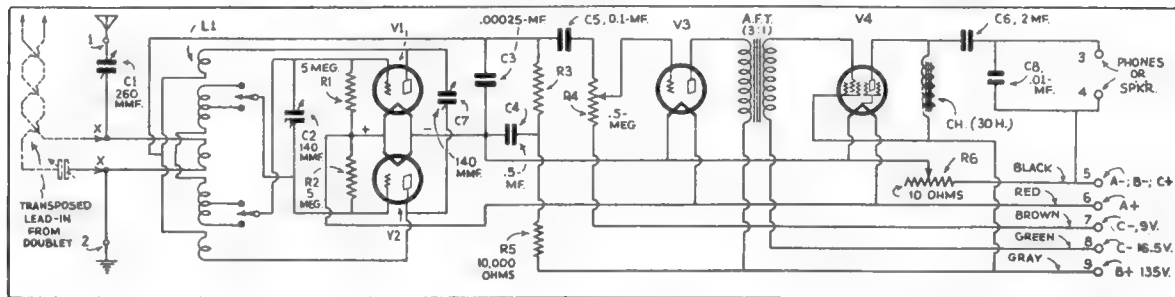
the grid resistor for the second audio stage are the same as in the first and again proved to be the optimum values.

At this point it must be stressed that it is necessary to shield the grid lead of the second stage as this lead comes out at the top of the tube and necessitates a rather long connection. With no shield on this lead there was considerable feed-back which rendered the two stages useless. No cathode bias resistor was found necessary; many values were tried without the slightest improvement.

Operated under the conditions outlined above the amplifier worked very nicely into a magnetic type loud-speaker. A dynamic speaker however, gave much better tone reproduction and slightly greater volume. With the D.C. tubes it would be necessary to use a dynamic speaker having a field coil wound for 6 volt battery operation, unless a power supply were used where the field coil could take the place of one of the filter chokes.

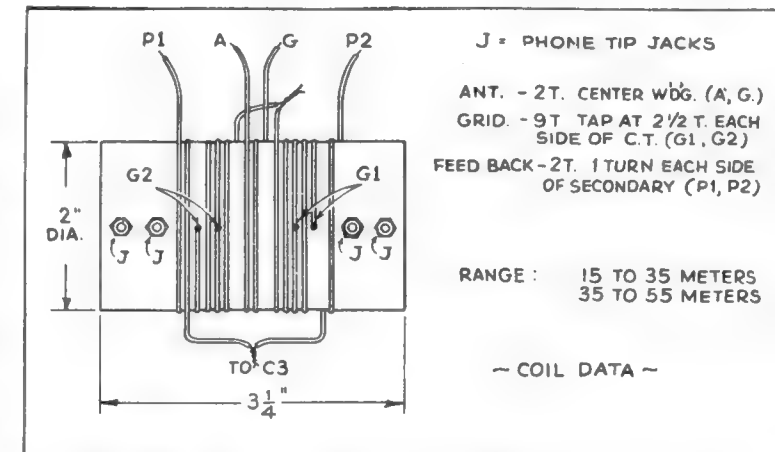
—Short Wave Craft, Feb., 1934.

New Stand By Receiver



Parts List—Denton Stand-By

- One National "Velvet-Vernier" Dial, type E.
- Two Hammarlund Type MC 140-M (140 mmf.) Midget Tuning Condensers (National) (C2, C7).
- One Hammarlund Type MC250M 260 mmf. Midget Tuning Condenser (National) (C1).
- Three Hammarlund Flexible Coupling Units.
- Three four-prong sockets (V1, V2, V3).
- One five-prong socket (V4).
- One Antenna-Ground Strip (1, 2).
- One Phone Strip (3, 4).
- One 7 wire cable and plug (5, 6, 7, 8, 9).
- One 10 ohm rheostat or Amperite 4-1 (R6).
- One Bypass Condenser, 2 mf., 200 volts (C6).
- One Tubular Condenser, .1 mf., 200 volts (C5).
- One Bypass Condenser, .5 mf., 200 volts (C4).
- One Tubular Condenser, .00025 mf., 1000 volts (C3).
- One Tubular Bypass Condenser, .01 mf., 400 volts (C8).
- Two Acratist 5 meg., .5 watt resistors (R1, R2).
- One Acratist .5 meg. potentiometer (R4).
- One Acratist 10,000 ohm, 1-watt resistor (Lynch; I.R.C.) (R5).
- One Acratist Audio Frequency Transformer (AFT).



- One Acratist 50,000 ohm, .5 watt resistor (Lynch; I.R.C.) (R3).
- One Acratist 30 Henry Choke (CH).
- One Wooden Baseboard, 9 by 14 inches.
- One Blau, 7 by 14, Aluminum Panel.
- Three Blau Aluminum Brackets.
- Three 3/4 inch diameter, 7 inches long, bakelite rods.
- Four Phone-tip jacks.

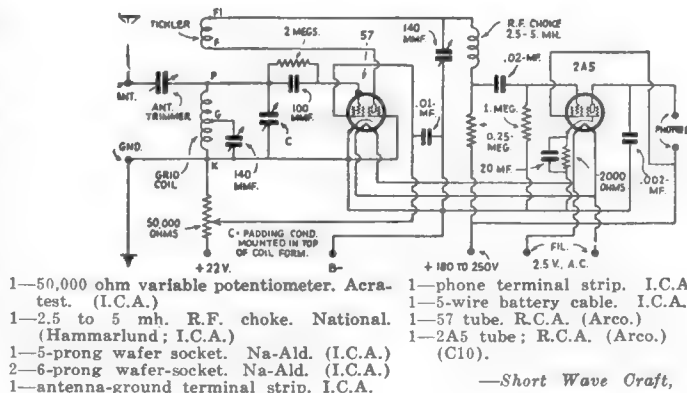
- Four standard 1 inch black knobs.
- Wire, woodscrews, etc.
- Three type 30 tubes. R.C.A. Radiotron (Arco).
- One type 33 tube. R.C.A. Radiotron (Arco).
- 2 vt. (filament supply) Air-Cell Battery (Nat'l Carbon Co.) (optional).

—Short Wave Craft, April, 1934.

The Band-Spread "Doerle"

Parts List—2-Tube Doerle Band-Spread

- 1—set of Na-Ald "band-spread" coils.
- 1—drilled metal chassis. Radio Trading Co.
- 2—140 mmf. variable tuning condensers. Hammarlund. (National; I.C.A.).
- 1—antenna trimmer (low min. cap.) 35 mmf. max.
- 1—.0001 mf. mica condenser. (Polymet.)
- 1—.01 mf. bypass condenser. I.C.A. (Polymet.)
- 1—.02 mf. bypass condenser. I.C.A. (Polymet.)
- 1—.002 mf. bypass condenser. I.C.A. (Polymet.)
- 1—20 to 25 mf. 25-volt electrolytic condenser. (Polymet.)
- 1—2 meg. grid-leak. Lynch.
- 1—1 meg. grid-leak. Lynch.
- 1—250,000 ohm resistor. Lynch.
- 1—2,000 ohm resistor. Lynch.



The Victor Easy-Tune 2-Tube Band-Spreader

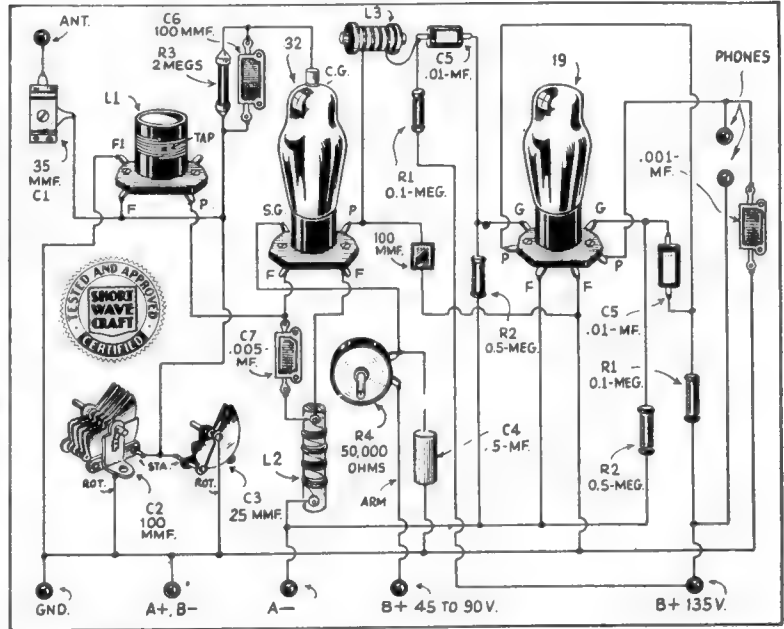
Parts List for 2-Tube Band-Spreader

- 1—Special set of coils; see table.
- 1—Special R.F. 2.5 mh. choke, (Hammarlund; I. C. A.)
- 1—100 mmf. var. condenser, Hammarlund; I. C. A.)
- 1—25 mmf. var. condenser, (Hammarlund; I. C. A.)
- 2—100 mmf. fixed condensers, I. C. A. (Polymet) (Choose nearest size).
- 1—.005 mf. fixed condenser, I. C. A. (Polymet).
- 1—35 mmf. antenna trimmer, (Hammarlund; I. C. A.)
- 2—.01 mf. bypass condensers, Polymet.
- 1—.001 mf. bypass condenser, Polymet.
- 1—.05 mf. bypass condenser, Polymet.
- 1—2 meg. grid-leak, Lynch.
- 2—.01 meg. resistors, Lynch. (I. R. C.)
- 2—.05 meg. resistors, Lynch. (I. R. C.)
- 1—50,000 ohm variable resistor, Acra-test I. C. A.)
- 1—4-prong wafer socket, Na-Ald.
- 1—6-prong wafer socket, Na-Ald.
- 1—4-prong Isolantite socket (Hammarlund; I. C. A.)
- 1—dial.

Coils Wound on Tube Bases

The coils are wound on four-prong tube-bases, with number 30 d.c. wire. The following is the number of turns for the various bands:

Band	Grid to Fil.	Fil. to Ground
80m.	20 t.	1½ t.
40m.	12 t.	1½ t.
20m.	3 t.	1¼ t.



A little juggling with the tickler section band with the particular antenna used. After the coils are correct, coat them with collodion or Duco, so that they will hold the set oscillating properly over the entire their characteristics.

—Short Wave Craft, June, 1934.

Modernized Meyers 3-Tube Set

Data for Coils in Myers Receiver

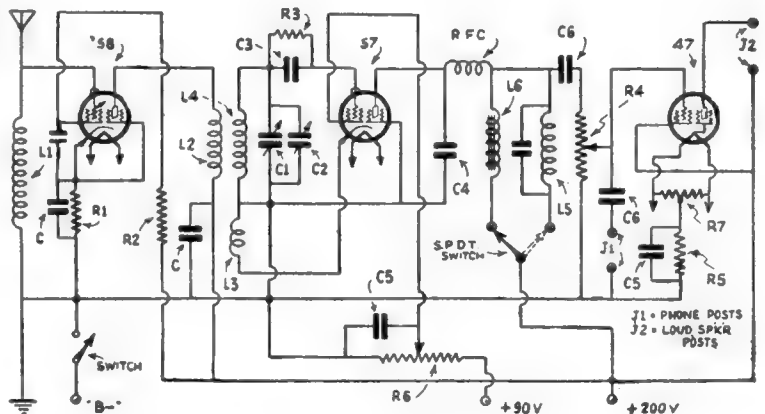
Range	L2	L3	L4
18-26 met.	6 turns	1 turn	6 turns
37-63 met.	10 turns	1 turn	15 turns
61-100 met.	15 turns	1 turn	30 turns
100-190 met.	20 turns	2 turns	60 turns

All wound with No. 28 DSC on five-prong forms.

CONSTANTS OF THE CIRCUIT

- C—.006 mf. mica condenser.
 C1—3 plate midget condenser.
 C2—50 mmf. condenser.
 C3—100 mmf. fixed condenser.
 C4—100 mmf. fixed condenser.
 C5—1 mf. fixed condenser.
 C6—.01 mf. fixed condenser.
 R1—300 ohm, 1 watt resistor.
 R2—100,000 ohm, 1 watt resistor.
 R3—5 megohms.
 R4—500,000 ohm potentiometer.
 R5—1,000 ohm, 1 watt resistor.
 R6—50,000 ohm potentiometer.
 R7—30 ohm center tap resistor.
 L1—100 turns on half inch form.
 L5—Aero Hi-Peak coupler.
 L6—National S-101 coupler.

—Short Wave Craft, April, 1933.



The Electrodyne 1-Tube Set

This attractive one tube receiver, of undoubted interest to every short-wave beginner, employs the latest electron-coupled circuit. Distant short-wave transmitters in practically every country were heard with this receiver.

Parts List for Electrodyne

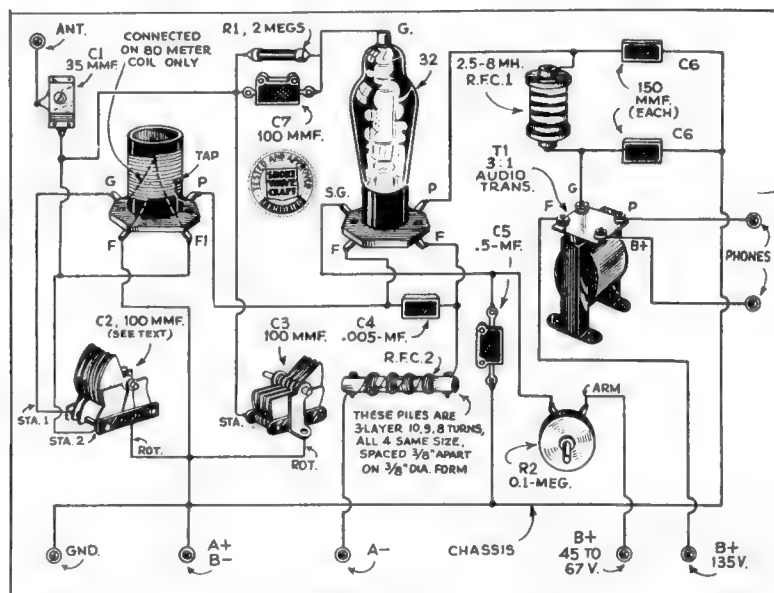
- 1—35 mmf. antenna trimmer, National (Hammarlund).
- 1—100 mmf. National 270 degrees condenser cut down, see text.
- 1—100 mmf. condenser, variable, National (Hammarlund).
- 1—.005 mf. mica condenser.
- 1—.00015 mf. mica condenser.
- 1—.001 mf. mica condenser.
- 1—.05 mf. by-pass condenser.
- 1—1 meg. half watt resistor, Lynch (I.R. C.).
- 1—100,000 ohm variable resistor, Acratest.
- 1—2.5 to 5 mh. choke, National (Hammarlund).
- 1—filament choke (special), see text.
- 1—3 to 1 audio transformer, National (or other make).
- 2—four prong Isolantite sockets, National (Hammarlund).
- 1—dial, National type B; 270 degree.
- 1—set of coils, see coil table.
- 1—232 type tube, R. C. A. Radiotron (Arco).

Coils Wound On Tube Bases

The coils are wound on four-prong tdbases, with number 30 d.c.c. wire. The following is the number of turns for the various bands:

Band	Grid to Fil.	Fil. to Ground
80m.	20 t.	1½ t.
40m.	12 t.	1½ t.
20m.	3 t.	1½ t.

A little juggling with the tickler section of the coil, that is, moving it up and down on the tube base, may be necessary to get the set oscillating properly over the entire band with the particular antenna used. After the coils are correct, coat them with collodion or Duco, so that they will hold their characteristics.



Filament Choke Used

Since the tube is directly heated, and it is necessary to keep the filament above ground R.F. potential, a filament choke is necessary. The .005 mf. condenser across the filament is used to provide a low-impedance path for R.F. so that both sides of the filament may be at the same potential above ground. The filament choke is wound on a piece of ¾ inch dowel, 4 inches long. There are four pies of number 28 cotton covered wire on it. Each of these pies is wound in three layers. The bottom layer ten turns, the second layer nine turns, and the top layer eight turns. The pies are spaced ⅛ths of an inch apart. After the choke is completed it should be covered with a coat of collodion or clear Duco. With a little care this choke can be properly made, and caution should be taken, as the choke is one of the most important parts of the set.

—Short Wave Craft, May, 1934.

Unitrol Simplifies Band-Spread

(Continued from previous page)

To construct the special tuning condenser shown in the drawing it is necessary to obtain one 20 mmf. and one 140 mmf. Hammarlund tuning condensers. These were chosen because they lent themselves readily to the arrangement.

A one-eighth inch hole is drilled through the center of the shaft of the 20 mmf. condenser unit. It is best, if one does not have a drill-press or lathe, to take it to the local machine shop and have it done accurately. After this is done saw a slot in the front of the shaft to fit a piece of number 14 bus

bar. A similar slot is cut in the front of the 140 mmf. condenser shaft. These slots are used to lock the two condensers together. Now mount the two condensers on a metal strip as shown in the drawing and we are ready to install the shaft.

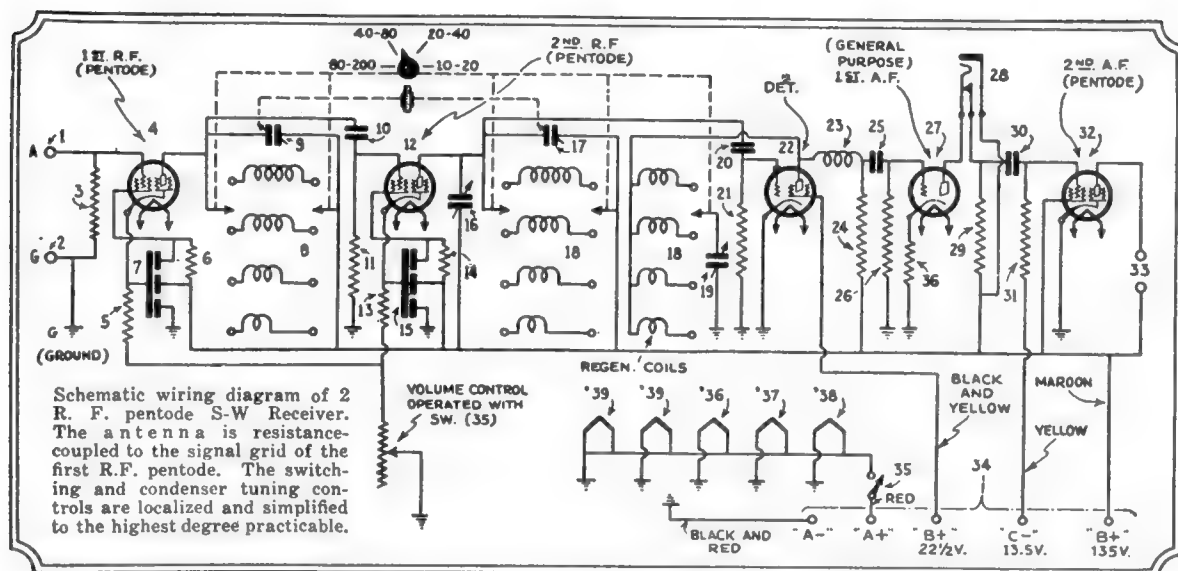
Procure a length of brass shafting that will fit snugly in the hole drilled in the shaft of the small condenser. Shape the end of the shaft to fit in the slot cut in the large condenser; if a better job is wanted a pin, as used by the author, can be fitted to the end instead. Now insert the shaft and engage it in the large condenser

firmly, so that it can be marked for the front pin. The shaft has two pins, one for the rear and one for the front condenser. Mark the shaft for the pin which engages the small condenser and drill the hole very accurately as there should be no difference in the settings of the two condensers when the shaft is engaged in the two.

Thread the end of the shaft so that a small binding post-knob can be attached for shifting from "regular" tuning to "bandspread."

—Short Wave Craft, April, 1934.

2 R.F. Pentode S-W Set



Parts List

- 1—Eby Antenna—Ground Post (1, 2).
- 3—International 1-watt Resistors (3, 6, 14), (50,000 ohms each).
- 2—Eby Wafer Sockets, '39 type (4, 12).
- 1—Eby Wafer Socket, '36 type (22).
- 1—Eby Wafer Socket, '37 type (27).
- 1—Eby Wafer Socket, '38 type (32).
- 1—Hammarlund Dual Condenser, MDC-140M (140 mmf. each section) (9, 17).
- 1—Hammarlund Condenser, MC-250M (250 mmf.) (19).
- 3—Hammarlund Tube Shields.
- 2—Blan By-Pass Condensers, triple 0.1-mf. (7, 15).
- 2—International 1-watt Resistors, 500-ohm. (5, 13).
- 1—Electrad Volume Control RI-202P (35) with power switch.
- 1—Crowe Tuning Dial.
- 1—"Best" Mfg. Co., Multi-Range Inductance Unit (8).
- 1—"Best" Mfg. Co., Multi-tuner Regenerator Unit (18).
- 1—Pilot 5-Plate 15 mmf. Midget Condenser with Insulating Washers (16).
- 2—Illini Mica Condensers, 125 mmf. (10, 20).
- 1—Pilotohm 3 megohms. (21).
- 1—Pilotohm 3 megohms. (11).
- 1—Blan "Best" Tuner Shield, drilled and folded, with coil mounting brackets.
- 1—Blan R.F. Choke.
- 1—Blan Flexible Coupler, complete with extension shaft and reducing bushing.

Ten to two hundred meters—all the short-waves—At a "twist of the wrist" and with two stages of "working" radio frequency amplification to boot, the receiver incorporates a multi-stage, pentode, R.F. amplifier plus a regenerative detector and a resistance-coupled audio amplifying system.

6.3 volt tubes are used throughout, making it possible to operate the heaters from a storage battery or from an AC transformer.

- 2—Dubilier .015-mf. Mica Metal-Bound Condensers (25, 30).
- 3—International Resistors, one-half watt, 0.25-meg. (24, 26, 31).
- 1—International Resistor, one-half watt, 0.1-meg. (29).
- 1—Eby Speaker Twin Jack (33).
- 1—Frost Closed-Circuit Jack, with insulating washers (28).
- 1—International Resistor, 1-watt, 2,500-ohm. (36).
- 1—Eby 5-Prong Male-Type Wafer Socket, with female plug and cable (34).
- 1—Grid-Grip Screen-Grid Clip.
- 9—Insulating Eyelets.
- Miscellaneous Nuts, Bolts, Soldering Lugs, etc.
- 20 ft. Rubber Covered Push-Back Wire.
- Dial Lamp and Socket.

The radio-frequency stages are of the tuned-plate type and, with a tuning condenser which has an isolantite base, it is not necessary to insulate the rotor from the chassis. It is important to note that the rotor shaft of the condenser should not "ground" through the tuning dial; use the flexible coupling.

The detector is the standard leaky-grid type, with condenser control of regeneration.

Resistance coupling is used throughout the audio system, which has a low impedance tube in the first stage and a pentode in the output circuit.

The phone jack is handy for tuning in distance, and its use in the plate circuit of the first audio stage does not cause a change in any of the preceding stages.

All of the tubes are of the six-volt type, and operate directly from a storage battery or from an A.C. transformer.

A 75,000-ohm variable resistor is used in the cathode circuits of the radio frequency tubes as a volume control.

After the batteries have been connected as shown in the diagram, turn the radio-frequency volume control full on; this closes the filament circuit. Wait a short time for the tubes to heat up.

Select the waveband to which you want to listen by moving the band selector switch to the proper point, as shown on the indicator furnished with the coils.

Turn the regeneration control knob and, if the receiver does not give the familiar response, reverse the leads to the feedback coils on the larger tuning unit.

If the detector oscillates, turn the master tuning condenser dial until a voice or telegraph signal is heard. Adjust the trimming condenser for maximum response.

—Short Wave Craft, April, 1932.

2.5MH. R.F.C. 0.02-MF. 0.5-MEG. 0.1-MF. 100 MMF. 250 MMF. 2A5 PHONE CONN. SPKR TRANS. TO VOICE COIL. 25-MEG. 15000 OHMS. 25V MF. (400V) EACH. 15 MEG. 1500 OHMS T1 300 OHMS. 0.1-MEG. (1W.). 25V MF. (400V). 50,000 OHMS. 25V MF. 8 MF. 25V MF. (400V). 25V. 5V. HV. 110V. A.C. 0.1-MF. CH. = 300 TO 700 H. C = 140 MMF. 2-GANGED COND. CHASSIS. GND. SW.

-WINDING DATA-			
20-40 METERS	40-80 METERS	80-100 METERS	100-250 METERS
GRID - 6 T. NR 18 ENAM. WIRE 3/16" SPACING BETWEEN TURNS	GRID - 29 T. NR 22 ENAM. WIRE 1/16" SPACING BETWEEN TURNS	GRID - 50 T. NR 24 ENAM. WIRE 1/32" SPACING BETWEEN TURNS	GRID - 89 T. NR 28 ENAM. WIRE CLOSE WOUND.
SPACE BETWEEN GRID AND TICKLER - 1/8".	SPACE BETWEEN GRID AND TICKLER - 1/8".	SPACE BETWEEN GRID AND TICKLER - 1/16".	SPACE BETWEEN GRID AND TICKLER - 7/16".
TICKLER - 6 T. NR 26 S.S.C. WIRE CLOSE WOUND	TICKLER - 14 T. NR 26 S.S.C. WIRE.	TICKLER - 22 T. NR 26 S.S.C. WIRE.	TICKLER - 42 NR 28 ENAM WIRE

- COIL CONNECTIONS -

GRID R.F. TUBE
AND TUNING
CONDENSER

TO DOUBLET

ANT.

DET.
-PLATE
CHOKE
AND BY-PASS

R.F.

R.F. PLATE
AND TUNING
CONDENSER

R.F. PLATE
CHOKE
AND BY-PASS

R.F.

- BOTTOM VIEW -

- BOTTOM VIEW -

COILS

- 2—Sets (8 coils) Coils.
2—Bud 30 mh. R.F. Choke Coils.

1—.00014 mf. two-gang tuning condenser.
1—.00005 mf. Hammarlund Midget Con-
denser.
2—8 mfd. 500 v. Electrolytic Condensers.
3—.25 mf. 400 v. Condensers.
4—.25 mf. 200 v. Condensers.
1—.02 mf. 400 v. Condenser.
3—.01 mf. 400 v. Condensers.
1—.0002 mf. Mica Condenser.
1—.0001 mf. Mica Condenser.

1—50,000 ohm Variable Potentiometer with Switch.

1—100,000 ohm 1-watt Carbon Resistor.

1—25,000 ohm 1-watt Carbon Resistor.

1—4 meg. ½-watt Carbon Resistor.

1—500,000 ohm ½-watt Carbon Resistor.

1—250,000 ohm ½-watt Carbon Resistor.

1—150,000 ohm ½-watt Carbon Resistor.

1—15,000 ohm ½-watt Carbon Resistor.

1—350 ohm ¼-watt Carbon Resistor.

1—Power Transformer. Rating:
1 650 V. 60 Ma. HV Secondary.
1 2.5 V. 5 A. Secondary.

- 1 5 V. 2 A. Secondary.
- 1 110/190 V. Primary.
- 1—300 henry Choke—3 Ma. capacity.
- 1—"RGH-4" Chassis.
- 1—Coil Shield.
- 2—58 Tube Shields.
- 5—Wafer Sockets.
- 1—5-prong Speaker Plug.
- 2—4-prong Coil Sockets.
- 1—Dial-Escutcheon Plate and Light Bracket.
- 3—Knobs.
- 3—Binding Posts—Phone Posts.
- 1—1,800-ohm tapped Speaker, single pentode output.
- 1—Resistor Mounting Strip.
- 1—Line Cord and Plug.
- 1—Roll Birnback Hook-up Wire No. 18.
- 1—Solder—Hardware.

Plug-in coils are used in the RGH-4, two of the same color for each band or five sets (ten coils) for the complete range from 16 to 550 meters. The coils are mounted near the tuning condenser on the chassis. The detector coil is placed under a shield to prevent any stray feed-back to the antenna stage which is unshielded. The detector plate is impedance coupled—necessarily so since the high plate impedance of the 58 detector eliminates the possibility of transformer coupling and the high value of the required load resistor in a theoretical resistance stage would not allow the proper

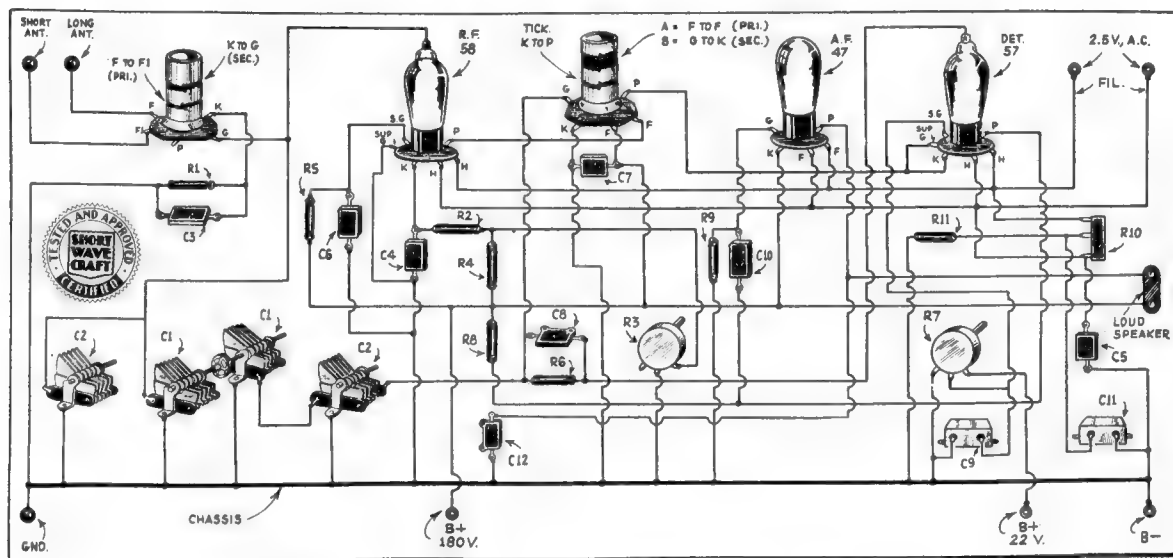
effective voltage on the detector plate. The choke used in the stage is a high impedance one, with ample current carrying capacity.

Because of the high efficiency obtainable from the regenerative detector it is possible to obtain ample loud-speaker volume even on very weak foreign signals with only one stage of audio, so much so that it was found inadvisable to use more than this one stage. The bias for the 2A5 was taken from the speaker tap adding further to the economy and simplicity of the RGH-4.

Almost any kind of antenna can be used with this receiver as can be seen by glancing at the diagram. The antenna coil connections are left free in each case in order that the antenna having a two-wire feed system can be used. For antennas not having two-wire feed systems the point, P, will be connected to F on the secondary coil which is grounded. With two-wire feed systems, the antenna proper should be kept in the clear in order to derive full benefit from the feeders, which can be either parallel or transposed. In some cases an increase in signal strength can be obtained by inserting a .0005 m.f. variable condenser in series with one of the feeder wires. Adjustment of the condenser will then tend to bring the antenna system nearer to resonance with the signal frequency.

For those wishing to listen on the broadcast band above 250 meters the grid coil should have 122 turns of No. 30 enameled wire wound in a length of $1\frac{3}{4}$ inches. The tickler will have 32 turns of No. 34 wire, close-wound. Two of the above coils will be necessary.

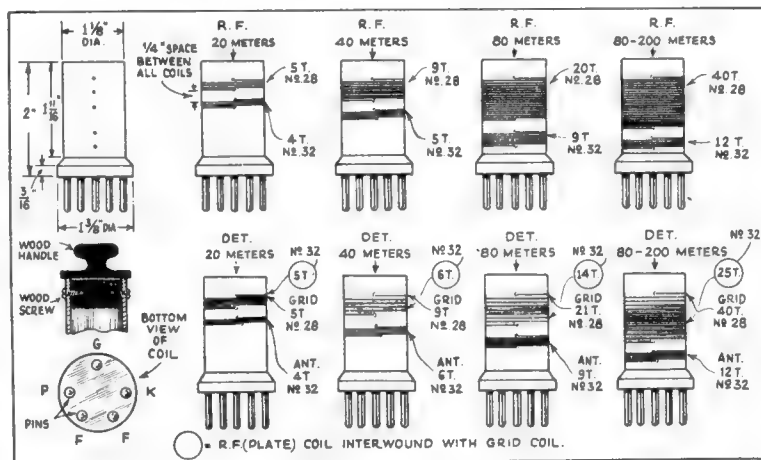
A 3-Tube Band Spreader



List of Parts

- 1—7x10x1/16" aluminum panel.
- 2—5 1/2 x 2 1/2 x 1/16" sheet aluminum for shields.
- 1—12x10" aluminum for base.
- 1—Type 58 tube Sylvania (R.C.A.).
- 1—Type 57 tube Sylvania (R.C.A.).
- 1—Type 47 tube Sylvania (R.C.A.).
- 6—Hammarlund coil forms (five prong) "small" Isolantite.
- 2—Hammarlund five-prong sockets Isolantite.
- 2—Hammarlund six-prong sockets Isolantite.
- 2—Hammarlund 100 mmf. tuning condensers.
- 2—Hammarlund 35 mmf. tuning condensers.
- 1—Hammarlund flexible coupling.
- 1—National type "B" dial.
- 1—100,000 ohm Electrad potentiometer (ClaroStat).
- 1—5,000 ohm Electrad potentiometer (ClaroStat).
- 2—Aerovox .5 mf. bypass cond. (Polymet).
- 5—Aerovox .01 mf. fixed cond. (Polymet).
- 1—Aerovox .005 mf. fixed cond. (Polymet).
- 1—Aerovox .0001 mf. fixed cond. (Polymet).
- 1—Aerovox .00025 fixed cond. (Polymet).
- 2—Aerovox 250,000 ohm resistors (Lynch).
- 1—Aerovox 100,000 ohm resistor (Lynch).
- 1—Aerovox 15,000 ohm resistor (Lynch).
- 1—Aerovox 2,000 ohm resistor (Lynch).
- 1—Aerovox 300 ohm resistor (Lynch).
- 2—Aerovox 2 megohm resistors (Lynch).
- 1—Aerovox 20 ohm C.T. resistor (ClaroStat).
- 1—Eby five-prong socket.
- 1—Hammarlund "Triple-grid" tube shield.
- 1—Five-wire cable.
- 1—Antenna binding post assembly.
- 1—Speaker cord tip assembly.

As can be seen, this set uses a type 58 as the tuned R.F. amplifier and a type 57 as a detector, with a 47 as audio amplifier,



a 56 can be used instead of the 47 if ear-phones are to be used.

When using a stage of tuned R.F. ahead of an autodyne detector it is absolutely necessary to have some sort of R.F. gain control if overloading of the detector is to be eliminated. Therefore a type 58 is used in order to obtain control of volume by the cathode method. This type of control is very quiet in operation and has very little effect on the tuned circuit. As can be seen in the diagram, the grid circuit of the R.F. stage is decoupled by a 250,000 ohm resistor and a .01 mf. condenser. This helps to prevent the R.F. stage from detuning and allows the full benefit of the shielding. Screen grid voltage is obtained with a 100,000 ohm resistor which adds to decoupling and eliminates one wire in the

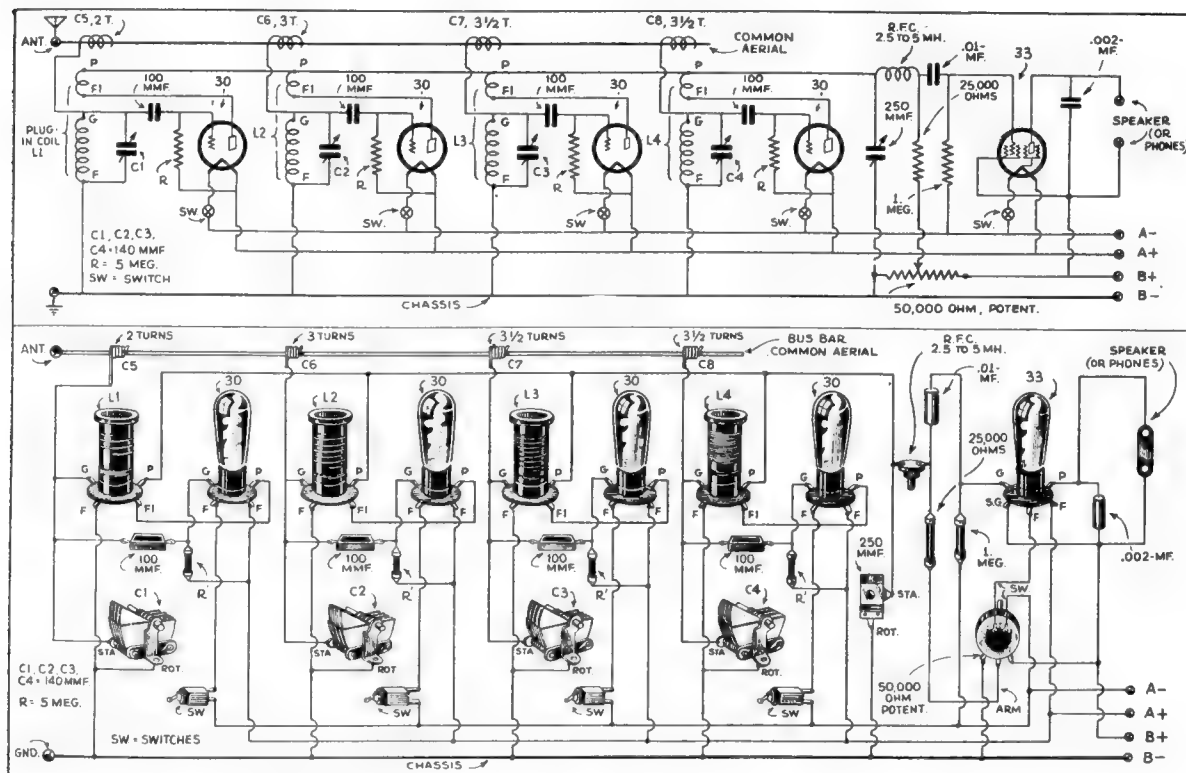
cable. Isolantite coil forms and socket and tube sockets are used because of their low loss.

A separate winding on the detector coil form provides the R.F. coupling between the R.F. stage and the detector. This is the most efficient means of coupling and should be used whenever high gain and stability are required. Bypass condensers are used freely but no R.F. chokes are shown because no benefit was derived from them.

The type 57 was chosen as the detector because it oscillated much better at the higher frequencies than any other type. The detector circuit is of the electron-coupled type.

—Short Wave Craft, June, 1933.

The Tetradyne 5 Tube Set



Parts List for "TETRADYNE"

- 4—140 mmf. tuning condensers, National (Hammarlund).
- 1—Set of 4-plug-in coils, Alden (Gen-Win).
- 4—4-prong Isolantite sockets, National (Hammarlund).
- 1—5-prong socket, National (Hammarlund).
- 4—4-prong sockets, National (Hammarlund).
- 4—.0001 mf. mica condensers.
- 4—5 megohm grid leaks, ½ watt, Lynch (I. R. C.).
- 1—25,000 ohm ½ watt resistor, Lynch (I.R.C.).
- 1—1 meg. ½ watt resistor, Lynch (I.R.C.).
- 1—50,000 ohm variable potentiometer, with switch (Acratest).
- 4—filament switches.
- 1—.00025 mf. mica condenser.
- 1—.002 mf. mica condenser.
- 1—.5 mf. bypass condenser.
- 1—2.5 to 5 mh. R.F. choke, National (Hammarlund).
- 4—National 3-inch velvet-vernier dials.
- 1—14" x 7" aluminum panel (Blan).
- 4—UX 230 tubes RCA Radiotron (Arco).

The dream of every short-wave fan has at last been realized in this latest invention of Mr. Gernsback's—the TETRADYNE—which provides four distinct detector stages in one receiver, each stage having its own tuning condenser and coil. By merely flipping any one of four switches controlling the tubes in the different stages, each stage covering one distinct wave band, you are ready to instantly tune for stations in the "desired" stage; all without having to change plug-in coils.

- 1—UY 233 RCA Radiotron (Arco).
- 1—Antenna ground terminal strip.

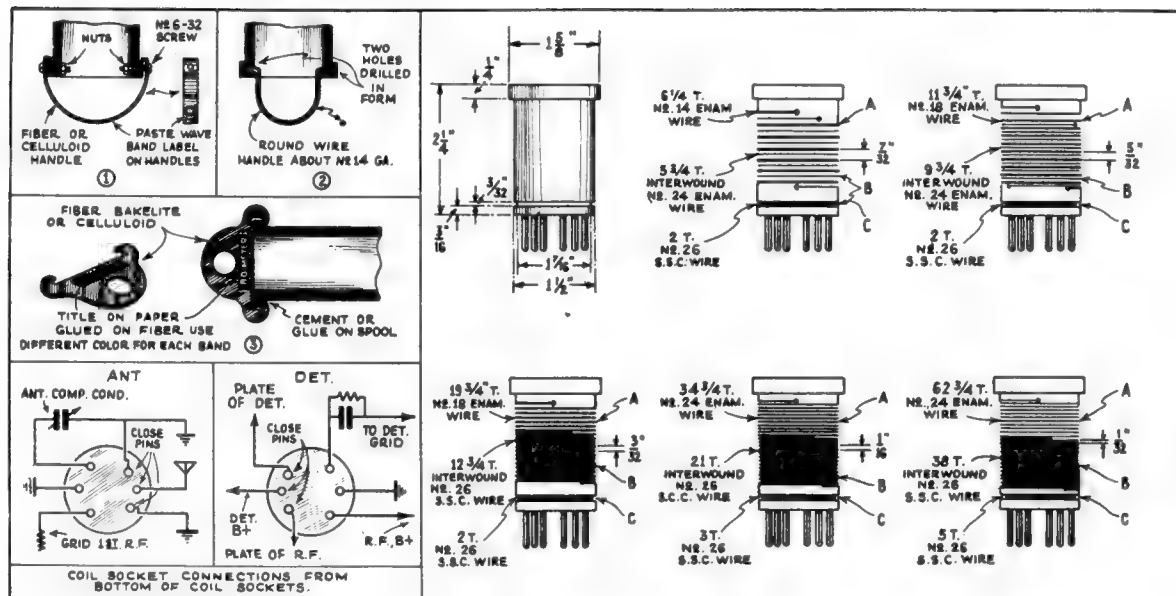
- 1—Phone terminal strip.

—Short Wave Craft, April, 1934.

Na-ald Plug-in Coil Data

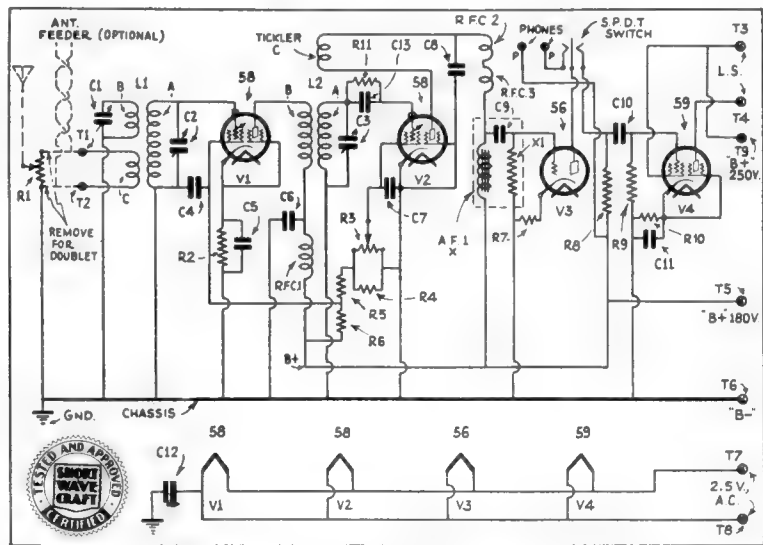
Meters	Grid coil turns	Tickler turns	Distance between 2 coils
Wavelength			
200-80	52 T. No. 28 En. Wound 32 T. per inch	19 T. No. 30 En. Close wound (CW)	1/8"
80-40	23 T. No. 28 En. Wound 16 T. per inch	11 T. No. 30 En. C. W.	1/8"
40-20	11 T. No. 28 En. 3-32" between turns	9 T. No. 30 En. C. W.	1/8"
20-10	5 T. No. 28 En. 3-16" between turns	7 T. No. 30 En. C. W.	1/8"
Coilform—2 1/8" long by 1 1/4" dia.		4- pin base.	

"Master Composite-4"



Parts List

One National Co. Type 2-SE 100 tuning condenser (Cap. 100 mmf. each section). (C2, C3).
 Two National Co. Short Wave Chokes, Type 100, (RFC1, RFC2) (2.5 M. H.)
 One National Co. Radio Frequency Choke, Type 90 (RFC3) (90M. H.)
 One National Co. Screen Grid Coupling Impedance Type S101 (AF1).
 Two National Screen Grid Clips (V1, V2) type 24.
 Two National Coils Sockets, Isolantite 6 prongs for National Coils (L1, L2).
 Two National Isolantite Tube Sockets for 58 type tubes (V1, V2).
 One National Co. Antenna Compensating Condenser, Type ST-50 (C1) (Cap. 59 mmf.).
 One National Coil Cabinet (optional).
 Two National Co. Tube Shields Type T58 (V1, V2).
 One pair of the following National S. W. Coils, Nos. 61, 62, 63, 64, 65 (L1, L2).
 One National "Full Vision" Tuning Dial, Type VKE.
 Three Micamold .01 mf. mica condensers C4, C5, C12).
 One Micamold .0001 mf. Mica condenser (C15).
 One Micamold .00025 mf. mica condenser (C8).
 One Flechthelm Tubular Condenser .01 mf. (C10).
 One Flechthelm Electrolytic Condenser Type LT1000 (C11) 10 mf. 30 Vts.
 Two Flechthelm .25 mf. Bypass condensers (C6, C7) Type GF25.
 One Acratest Wire Wound Resistor. 5 Watt, 7000 ohms Cat. No. 5900 (R6).
 One Acratest Wire Wound Resistor. 5 Watt, 400 ohms Cat. No. 5900 (R10).
 One Acratest Carbon Resistor. .5 Watt, 300 ohms Cat. No. 5860 (R2).



One Acratest Carbon Resistor. .5 Watt, 2000 ohms Cat. No. 3500 (R7).
 One Lynch Mfg. Co. .5 Watt resistor .5 meg. (R9).
 One Lynch Mfg. Co. .5 Watt resistor .1 meg. (R8).
 One Lynch Mfg. Co. .5 Watt resistor 5 meg. (R11).
 One Lynch Mfg. Co. 1 Watt resistor 2000 ohms. (R5).
 One Lynch Mfg. Co. 1 Watt resistor 3000 ohms (R4).
 One Frost 40 series potentiometer Cat. No. 6182 (R1) 3000 ohms.
 One Frost 40 Series Potentiometer Cat. No. 6186 (R3) 50,000 ohms.
 One Wafer Socket Type 59, 7 prong (V4).
 One Wafer Socket 5 prong Type (V3).

(Continued on next page)

A Dual Regeneration Control Set

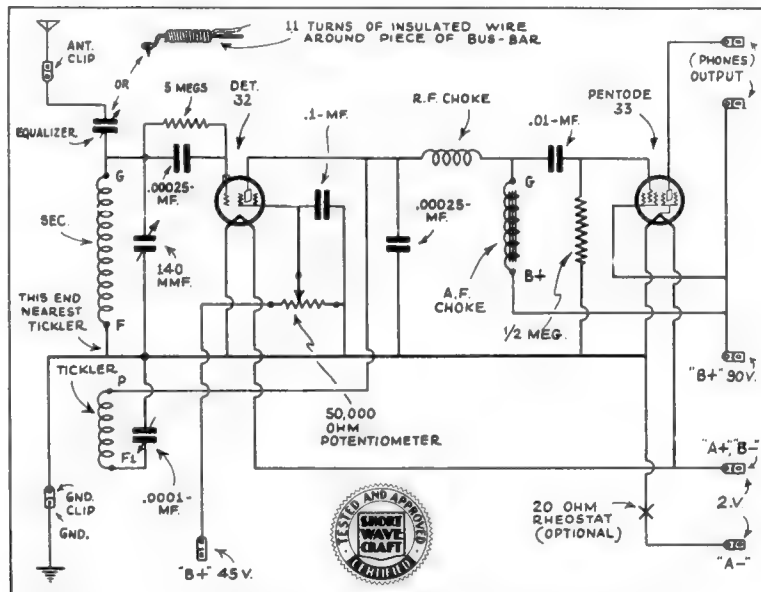
COIL DATA

Band Meters	Grid Coil Turns	Tickler Coil Turns	Space Between Coils
10-20	4 3/4 T. No. 22 Wound 6 T. per inch.	4 T. No. 31 Close wound	2 3/32"
20-40	10 3/4 T. No. 22 Wound 12 T. per inch.	6 T. No. 31 Close wound	3 1/16"
40-80	22 3/4 T. No. 22 Wound 16 T. per inch.	7 T. No. 31 Close wound	3 3/32"
80-200	51 3/4 T. No. 22 Wound 40 T. per inch.	15 T. No. 31 Close wound	1 1/2"
200-350	68 3/4 T. No. 28 Close wound	28 T. No. 36 Close wound	1 1/2"
350-500	131 3/4 T. No. 32 Bank wound in 2 layers.	32 T. No. 36 Close wound	1 1/2"

Data for Na-Ald coils form 1 1/4 inches dia. by 2 1/2 inches long (4 pin).

Parts List—Dual Control Set

- 1—antenna series condenser (about 10 to 25 mmf.) or Hammarlund equalizer, type E. C. 35.
- 1—tuning condenser Hammarlund MC 140 m. (Cap. .00014 mf.)
- 1—set S-W plug-in coils, Na-ald; (Gen-Win; Kresge; I.C.A. etc.) or other coils suited to match .00014 mf. condenser.
- 1—regen. control cond. Hammarlund MC-100M (Cap. .0001 mf.) (or National).
- 1—4 prong socket Na-ald (or Eby).
- 1—5 prong socket Na-ald (or Eby).
- 1—4 prong wafer socket for coil Na-ald (or Eby).
- 1—50,000 ohm potentiometer, Frost.
- 1—by-pass cond (for potent.) .1 mf., Flechtheim.
- 2—.00025 mf. condensers, Aerovox.
- 1—grid-leak, 5 meg., Lynch.
- 1—1/2 meg. resistor (couples grid of pentode to ground).
- 1—20 ohm rheostat, Frost.
- 1—R.F. choke, National, 2 1/2 m.h. (milli-henry).



- 1—.01 mf. condenser, Aerovox.
- 1—A.F. Choke: National type S101; or Silver-Marshall A.F. transformer with sec. and prim. con. in series.
- 1—32 type 2 vt. S.G. detector tube, Triad (R.C.A. or Arcturus).
- 1—33 pentode, 2 Vt. output tube, Triad (R.C.A. or Arcturus).

Binding posts (Eby).

- 1—panel, Blan, (or Insuline Corp. of America).
- 1—pair 4000 ohm, high impedance phones, to suit pentode; Trimm "feather-weight."

—Short Wave Craft, June, 1933.

"Master Composite 4"

(Continued from preceding page)

- One Yaxley S.P.D.T. rotary jack switch (S).
 - One Wafer socket and male plug for speaker.
 - One Eby Ant. Ground terminal strip (T1, T2).
 - One four-prong chassis mt'g plug and socket cable connector Type 7A-11 and 11A (T5, T6, T7, T8).
 - Two Eby Insulated Binding Posts (for phones) (P).
 - One Steel Chassis drilled and folded to specifications—Korrol Mfg. Co. or
 - One Aluminum Chassis drilled and folded to specifications, Blan-the-Radio-Man.
- NOTE—The builder has a choice of chassis material.
- One Drilled panel. Aluminum panel is dipped and the steel panel is cadmium plated.

- Two Blan—The-Radio-Man, special aluminum shields for the coils.
- Two Blan—The-Radio-Man "Hand-Hole" Covers for the coil openings.
- Two Blan—The-Radio-Man flexible couplings.
- Two 6 inch lengths of bakelite 1/4 inch in diameter.
- Four small brown knobs.
- Four 5 inch lengths of 6/32 threaded brass rod.
- Two Raytheon 58 type tubes (R.C.A.).
- One Raytheon 59 type tube (R.C.A.).
- One Raytheon 56 type tube (R.C.A.).
- Wire, soldering lugs, machine screws, etc.

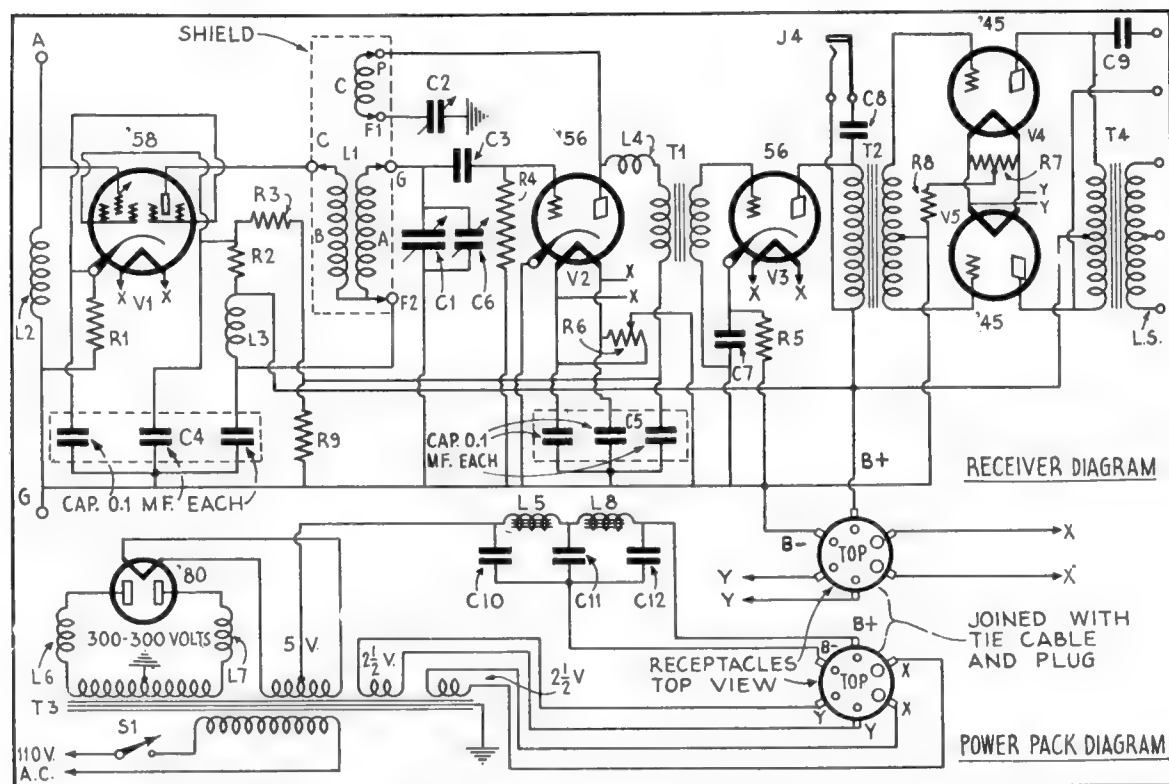
PARTS LIST OF THE POWER SUPPLY

- One Jefferson Power transformer. Type 463-934. (P.T.)
- One Federated Purchaser Cat. No. 2532.
- Two Jefferson Filter Chokes, Type SA2071.
- Federated Purchaser No. 2503. (CH1, CH2).

- Three Flechtheim Electrolytic Condensers. 8 mf., 500 volts peak. Type JW800 (C1).
- One Flechtheim Dry Electrolytic Condenser 8 mf., 500 peak volts Type KL800 (C2).
- One Korrol Mfg. Co. Steel, cadmium plated chassis drilled and welded.
- Aluminum chassis by Blan, The-Radio-Man.
- One Federated Purchaser power switch No. 4112 (S).
- One Federated Voltage Divider Cat. No. 3915. 25,000 ohms with taps (R).
- One Five Wire Cable (Use No. 16 wire in cable if possible).
- One Rubber Grommet.
- One Four prong wafer socket. Marked 280 (80).
- One Raytheon 80 rectifier tube (R.C.A.).

—Short Wave Craft, June, 1933.

The "Wyeth All-Wave 6"



Parts List

One Wyeth receiver panel, drilled, sprayed and baked black.
 One Wyeth special size chassis 16 1/4" by 8" by 2".
 One special aluminum shield for coil.
 One "Hand-Hole" Cover for coil opening.
 One National Dial—Type N Vernier.
 One .00014 mf. tuning condenser (C1).
 One .000075 mf. Midget condenser, (C2).
 One Hammarlund 3-plate midget condenser MC-20-8 (C6). Cap.-20 mmf.
 One .00015 mf. small moulded condenser (C3).
 Two bypass condenser banks (3-.1 mf. units in each) (C4) and (C5).
 Two tubular condensers 25 mf., 400 V. (C8) and (C9).
 One tubular condenser, 0.1 mf., 200 V., (C7).
 One 400 ohm resistor, 1 watt (R1) Lynch, (International).
 Two 8000 ohm resistors, 2 watt (R2) and (R3) Lynch, (International).
 One 4000 ohm resistor, 2 watt (R9) Lynch, (International).
 One 2 Meg. 1 watt (R4) Lynch, (International).
 One 2000 ohm, 1 watt resistor (R5), Lynch, (International).

Two 40 ohm C. T. resistors (R6) and (R7) Lynch, (International).
 One 800 ohm resistor 2 watt (R8) Lynch, (International).
 Three radio frequency chokes (L2), (L3), (L4)—85 M.H. each.
 One each of the following Short Wave Coils 131L, 131M, 131N, 131O, 131P and 131Q

(L1).
 One 1 to 3 interstage transformer (T1).
 One 1 to 2 input push-pull trans. (T2).
 One Output Transformer (optional) (T4).
 Two National Isolantite 11 prong tube sockets (V2) & Coil (L1).
 One National Isolantite 6 prong tube socket (V1).

This 6-tube all wave receiver was designed and built by an engineer who has had many years' experience in radio work. The panel of the set is 1/8" thick and allows the set to be mounted on a rack if so desired.

Coil No.	Wavelength Range in Meters	Secondary Turns. Connect to G and F2	Tickler Turns. Connect to P and F1
131L	16.6-31	6 1/2 No. 22 E.	5-2/3 No. 34 D.S.C.
131M	30-56.7	13 1/2 No. 22 E.	7-2/3 No. 34 D.S.C.
131N	55-104	25 1/2 No. 22 E.	12-2/3 No. 34 D.S.C.
131O	103-195	46 1/2 No. 24 D.C.C.	25-2/3 No. 34 D.S.C.

In above coils but two windings are present, secondary and tickler. Jumper connects prongs C and G of coil form.

Coil No.	Wavelength Range in Meters	Primary Turns. Connect to G and F2	Secondary Turns. Connect to G and F2	Tickler Turns. Connect to P and F1
131P	163-343	60 No. 37 E.	82 1/2 No. 29 E.	32-2/3 No. 34 D.S.C.
131Q	273-600	60 No. 37 E.	155 1/2 No. 34 D.S.C.	55-2/3 No. 34 D.S.C.

131 P and 131 Q have three windings—primary, secondary, and tickler. The primary coil is wound on a cardboard form 1 1/2 inches in diameter and is secured within the secondary winding. Coil ends are brought out to the prongs as shown in wiring diagram.

Short Wave Craft, Nov., 1933.

The Duo R.F. 4-Tube Receiver

Coil Table

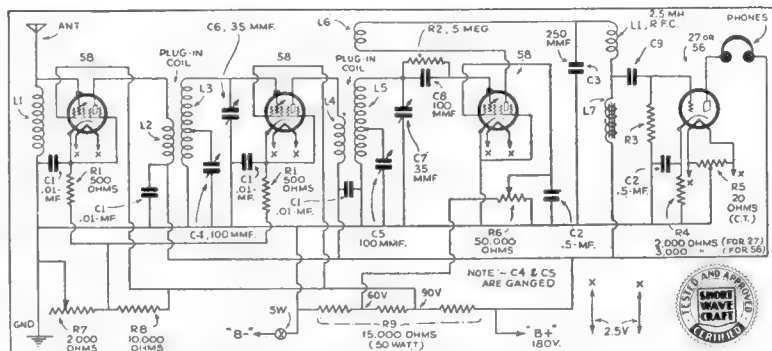
Coils are wound on standard National 6-prong coil forms. No. 24 DSC wire is used to wind the secondaries. No. 36 DSC to wind the interwound primaries and the coils are doped to keep the windings in place and to make them impervious to dirt. The tickler is wound in the filed slot with No. 36 DSC.

	20 meters.	40 meters.	80 meters.
L3, L5	9t.	19t.	32t. No. 24 DSC
L3, L5, tap,			
bottom	2 1/4	5 1/4	16 1/4
L2, L4	7t.	14t.	20t. No. 36 DSC
L6	3t.	3t.	4t. No. 36 DSC

General coverage coils for 17 to 100 meter range would have the same turns as the bandspread coils but each tuning condenser would then be across the whole of its secondary.

Parts List for 4-Tube Set

- 2—2.5 mh. R.F. chokes, National.
- 1—Audio coupling impedance unit (L7, C9, and Re) National S101 Impedaformer.
- 4—.01 mf. mica condensers.
- 2—.5 mf. by-pass condensers.
- 1—.00025 mf. mica condenser.
- 2—100 mmf. tuning condensers, National (Hammarlund).
- 2—35 mmf. padding condensers (mounted in



- coil forms) Hammarlund.
- 2—500 ohm, 1 watt resistors; Lynch (Int. Res. Corp.).
- 1—5 meg. grid leak, 1/2 watt; Lynch (Int. Res. Corp.).
- 1—2,000 ohm, 1 watt resistor; Lynch (Int. Res. Corp.).
- 1—20 ohm center tap resistor.
- 1—50,000 ohm potentiometer.
- 1—2,000 ohm variable resistor.
- 1—10,000 ohm, 1 watt resistor; Lynch.
- 1—15,000 ohm voltage divider with two supplying taps.

- 1—On-Off switch.
- 6—National R-39 coil forms.
- 2—National special coil sockets.
- 3—6-prong wafer sockets.
- 1—5-prong wafer socket.
- 1—National type F dial.
- 2—5x5x5" stage shield, Blan.
- 1—8x12 1/2 x 1/16" panel, Blan.
- 1—7 1/2 x 12 1/2 x 2" aluminum chassis, Blan.
- 3—type 58 tubes R.C.A., Radiotron (Arco).
- 1—type 56 or 27 tube R. C. A., Radiotron (Arco).

—Short Wave Craft, March, 1934.

The Beginners Twin Receiver

List of Parts

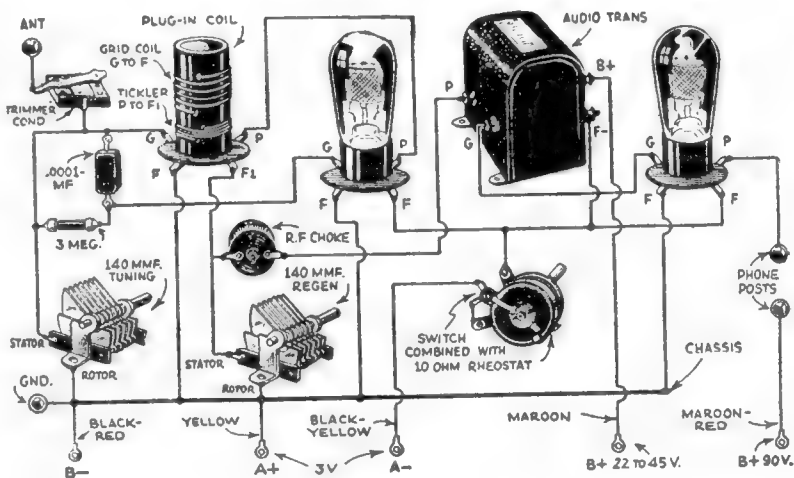
- 1—Try-Mo foundation kit, consisting of 10 1/2 x 8 inch panel and subpanel of same dimensions.
- 2—Hammarlund 150 mmf. midget variable condensers.
- 1—Hammarlund vernier drum dial.
- 1—Trimmer condenser for antenna circuit.
- 1—10 ohm rheostat with built in switch.
- 1—100 mmf. grid condenser, with 3 meg. grid leak.
- 1—Audio transformer (any ratio between 3:1 and 6:1).
- 1—Set of Powertest plug-in coils.
- 3—Four-prong sockets (two for tubes, one for coil).
- 1—Fused battery cable.
- 2—Twin binding post strips.
- 1—Short wave R.F. choke, about 60 mh.
- Assorted hardware.

Required Accessories:

- 2—Type 30 tubes.
- 2—No. 4 or No. 6 dry cells (preferably the latter).
- 2—"General" 45-volt "B" batteries.
- 1—Pair earphones, 2000 ohms.

Coil Data

Although factory-wound coils are available at low prices, some constructors of the "Beginner's Twin" may want to wind their own. The winding data follow:

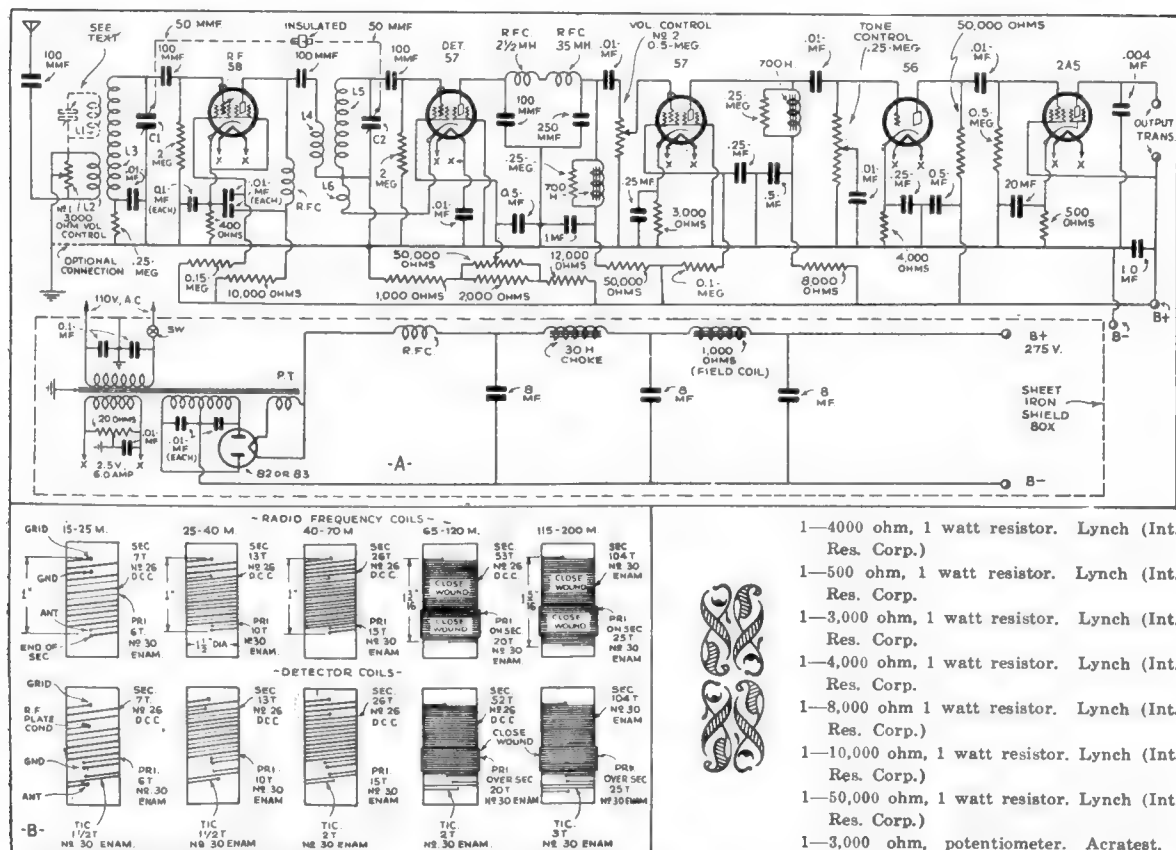


Four prong forms, 1 1/2 inches in diameter. No. 22 or 24 D.C.C. wire for grid coils, No. 26 or 28 S.C.C. wire for ticklers. Tickler at top of form, separated 1/4 inch from grid winding. Start of tickler goes to right F pin; finish to P. Start of grid coil to G, finish to left F pin. Both coils wound in same direction.

Wavelength range (approximate)	Grid Turns	Tickler Turns
16-30	6	6
29-58	13	13
54-110	21	15
103-200	54	27

—Short Wave Craft, May, 1933.

An Advanced 5-Tube Receiver



Perhaps the first point that will strike the reader's eye upon examination of the diagram is the unusual arrangement in the R.F. and detector circuits. It will be noticed that the tuning of circuits in both these stages are completely isolated from the tubes themselves by the .001 mf. condensers and the 2 megohm resistors in the grid circuits. This arrangement was adopted in order to provide some assurance that the tuned circuits would be working into high impedance loads of constant value.

Parts List

- 1—Dual gang 50 mmf. (.00005 mf.) variable condenser. National (Cardwell; Hammarlund).
- 2—6-prong isolantite sockets. National (Hammarlund).
- 2—5-prong isolantite sockets. National (Hammarlund).
- 2—6-prong wafer sockets. Na-ald.
- 1—5-prong wafer socket. Na-ald.

- 1—4-prong wafer socket. Na-ald.
- 5—.0001 mf. mica condensers.
- 1—.00025 mf. mica condenser.
- 12—.01 mf. mica condensers.
- 1—.004 mf. mica condenser.
- 2—.01 mf. tubular condensers.
- 4—.05 mf. tubular condensers.
- 3—.025 mf. tubular condensers.
- 1—1.0 mf. tubular condensers.
- 1—20 mf. Electrolytic 25 volts, tubular condenser.
- 3—8 mf. Electrolytic 500 volts, tubular condenser.
- 2—2.0 meg. ½ watt resistors. Lynch (Int. Res. Corp.)
- 3—0.25 meg. ½ watt resistors. Lynch (Int. Res. Corp.)
- 1—0.5 meg. ½ watt resistor. Lynch (Int. Res. Corp.)
- 1—0.15 meg. ½ watt resistor. Lynch (Int. Res. Corp.)
- 1—5000 ohms, ½ watt resistor. Lynch (Int. Res. Corp.)
- 1—0.1 meg. ½ watt resistor. Lynch (Int. Res. Corp.)

- 1—4000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—500 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—3,000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—4,000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—8,000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—10,000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—50,000 ohm, 1 watt resistor. Lynch (Int. Res. Corp.)
- 1—3,000 ohm, potentiometer. Acra-test.
- 1—50,000 ohm, potentiometer, with switch Acra-test.
- 1—250,000 ohm, potentiometer. Acra-test.
- 2—2½ M. H. Radio Freq. Chokes. National (2½ M. H.)
- 1—85 M. H. Radio Freq. Chokes. National 90 M. H. (Hammarlund.)
- 1—power transformer. National. 300-300 volts. (R. T. Co.)
- 1—30 H. choke. National. (R. T. Co.)
- 2—700 H. audio chokes. Acra-test. (R. T. Co.)
- 1—20 ohm center-tap filament resistor. (R. T. Co.)
- 1—shield can, 7"x7"x7" (sheet iron), for power supply.
- 1—58 tube R.C.A. Radiotron (Arco).
- 2—57 tube R.C.A. Radiotron (Arco).
- 1—56 tube R.C.A. Radiotron (Arco).
- 1—2A5 tube R.C.A. Radiotron (Arco).
- 1—83 mercury vapor rectifier. R.C.A. Radiotron (Arco).

—Short Wave Craft, March, 1934.

The "RGH"-5 Receiver

List of Parts

COILS:

- 2—Sets of six prong coils (8 coils).
- 2—Thor R.F. chokes.
- 1—NS44, 300 henry plate choke.
- 1—Thor power transformer, 700V-75MA.
- 1—Special speaker for parallel 2A5's.

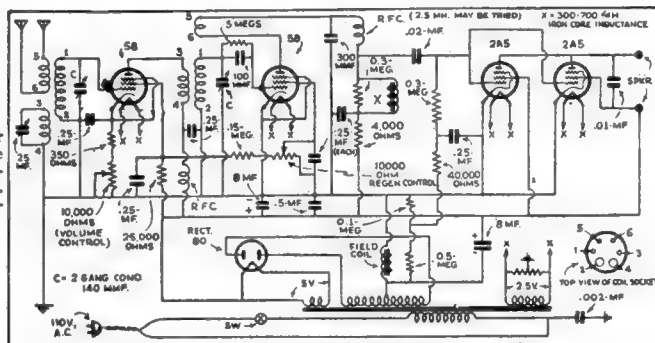
CONDENSERS:

- 1—140 mmf., two gang condenser.
- 1—25 mmf., midget condenser.
- 2—Thor 8 mf., 450V. electrolytic condensers.
- 4—.25 mf., 200 volt by-pass condensers.
- 2—.25 mf., 300 volt by-pass condensers.
- 1—.5 mf., 300 volt by-pass condenser.
- 1—.02 mf., 300 volt by-pass condenser.
- 1—.01 mf., 300 volt by-pass condenser.
- 1—.002 mf., 300 volt by-pass condenser.
- 1—.0003 mf., 300 volt by-pass condensers (mica).
- 1—.0001 mf., condenser (mica).

RESISTORS:

- 1—10,000 ohm potentiometer, with switch.
- 1—10,000 ohm variable control.
- 1—25,000 ohm one watt.
- 1—5 megohm half watt.
- 1—500,000 ohm half watt.
- 2—300,000 ohm half watt.
- 1—100,000 ohm half watt.
- 1—40,000 ohm half watt.

Hook-up for "RGH5" five tube short-wave receiver. It uses plug-in coils.



- 1—15,000 ohm half watt.
- 1—350 ohm half watt.
- 1—4,000 ohm half watt.

OTHER REQUIREMENTS:

- 1—Thor RGH 5 chassis, coil shields, and panel.
- 1—Crowe No. 125 airplane dial, escutcheon plates and pilot light bracket.
- 4—Knobs.

- 2—58 tube shields.
- 2—58 tube shields.
- 6—Wafer sockets.
- 2—6 prong coil sockets.
- 3—Binding posts.
- Resistor racks.
- Line cord and plug.
- No. 18 hookup wire.
- Solder and hardware.

—Short Wave Craft, Nov., 1934

The Original "Doerle" Set

Parts List

- 1—Bakelite panel 7" x 10".
- 1—Baseboard 9x11".
- 3—UX Sockets.
- 1—Tuning Condenser .00014-mf.
- 1—Throttle Condenser .00025-mf.
- 2—Condenser Plates 1½" square;
- 7—Terminal Post-strip.
- 7—Binding Posts.
- 1—5 Megohm Grid-leak.
- 1—.0001-mf. Grid Condenser.
- 1—5:1 Transformer.
- 2—Telephone Binding Posts.
- 2—3" Dials.
- 1—20-Ohm Rheostat.
- Hook-up wire, screws, etc.

Coil Data

Range (meters)	S	T
15-45	5	6
35-75	16	5
60-125	28	6

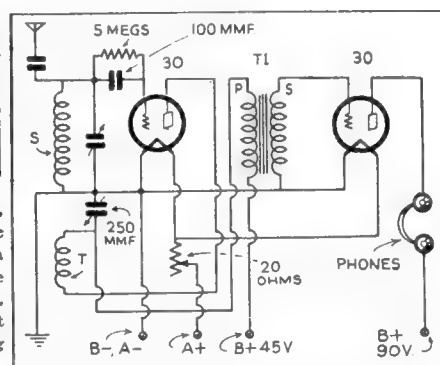
All coils are close-wound with No. 24 enamelled copper wire, and with no spacing between S and T.

Since this type of receiver would undoubtedly call for home-made plug-in coils, because of their convenience, we follow up our diagram with a discussion of this type of coil for the oscillating-circuit. To hold

This low-priced head-phone receiver comprises a few well-chosen parts arranged in a well-tried circuit.

the wire in place on the tube-base, the author has found orange shellac to have small loss, and it gives a shiny finish to the form As to the condensers for use in this receiver, select those that have the smallest amount of dielectric in supporting the stator plates.

Have you ever experimented with various values of grid condensers and leaks in the detector circuit? Well, get about twelve leaks (½ to 10 megs.) and twelve different sizes of grid condensers (.006-to



.0001-mf.) but first of all figure out the possible number of combinations.

Use a 5-megohm leak and .0001-mf. grid-condenser. These values will make the receiver very sensitive.

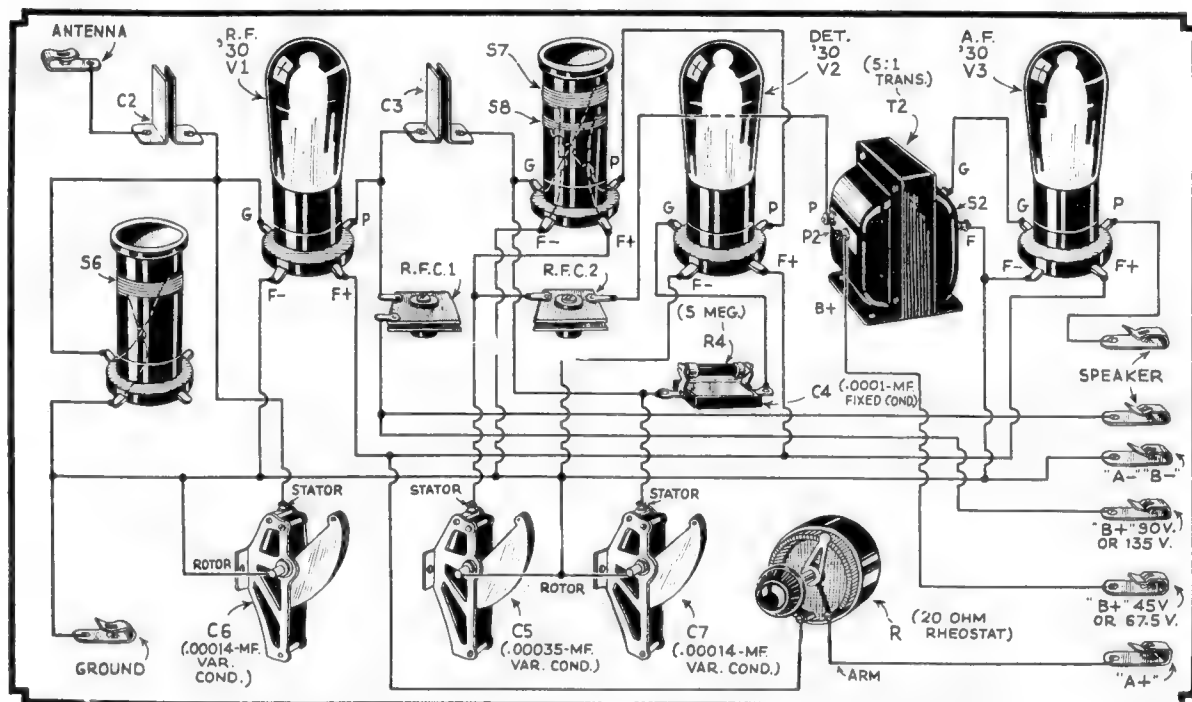
Be sure that the binding post strip is of bakelite as this is the cheapest though not the best insulation for the purpose. In some experiments made by the author, a home-made series condenser was made on a ¼ inch plywood baseboard; but a surprise awaited him. The signal as heard on the phones was about ¾ of the value as when

the series condenser plates were mounted on the bakelite strip.

If there is nothing else to gain from this item, be sure that when you make a 2-tube set to keep all losses as low as possible. It is hard to compensate for them.

—Short Wave Craft, Dec., 1931.

Doerle "Signal Gripper 3"



"Picture" diagram of the "Doerle" receiver which has given such excellent results.

List of Parts for 'Signal-Gripper'

- 1—Panel, 7 x 12 inches.
 - 1—Baseboard, 8 x 11 inches.
 - 2—Wood cleats, $\frac{1}{2}$ x $\frac{1}{2}$ x 8 inches.
 - 2—.00014-mf. variable condensers (C6, C7) and 2-inch dials.
 - 1—.00035-mf. variable condenser (C5) and 2-inch dials.
 - 4—Pieces of sheet copper, 1 x $1\frac{1}{4}$ inches (C2, C3).
 - 5—UX sockets.
 - 1—5:1 transformer (T2).
 - 7—Fahnestock clips.
 - 2—R.F. chokes.
 - 1—.0001-mf. grid condenser (C4).
 - 1—5-megohm grid-leak (R4).
 - 1—20-ohm rheostat or amperite 1H-1 (R).
- Hook-up wire, screws, etc.

Coil Data

Range	Coil Turns		
	RF	DET.	
15-25 meters	S6	S7	S8
24-45 meters	4	4	4
40-110 meters	8	8	5
	20	20	6

This is another model of the famous "Doerle" which has been so popular with the readers of SHORT WAVE CRAFT magazine. This set is battery operated and should give excellent results if carefully constructed.

All coils wound with No. 24 D.C.C. copper wire. Note also the feature that the coils give ample tuning range for the 20, 40, 80 meter short-wave code and phone amateur bands.

Condensers C2 and C3

As listed in the circuit constants (C2 equals C3), these condensers are made of thin copper sheet cut to 1 x $1\frac{1}{4}$ inches and spaced $1/16$ inch apart on the baseboard with their longest dimension folded $\frac{1}{4}$ inch, thus making effective areas of 1 x 1 inch. (If these are made too large, broadcast harmonics will "peep in" and also may cause blocking of the detector; if made too small, C3 will have such a high reactance in the region of 150-200 meters

that these signals will not be detected. In other words, not enough coupling will exist between the R.F. and detector stage in this region of wavelengths.)

Coil Details

Through an elaboration of constructional facts, the details for the coils have now appeared for consideration. These may be wound on the regular size tube bases and elsewhere on this page appears the necessary data for those who wish to "roll their own." Those shown in the drawing were purchased from a radio dealer and seem to be superior to those made on tube bases.

Several reasons may be mentioned why they are better—the forms are genuine bakelite, while a flock of tube bases today are more or less porous composition material; if metal subpanels are used and the coils are too close to it (as would occur with tube bases) a great deal of the R.F. energy "shoots" to ground because of the condenser action between coil windings and subpanel, and the coils, as seen from the appreciative side, make a set appear more majestic.

—Short Wave Craft, Nov., 1932.

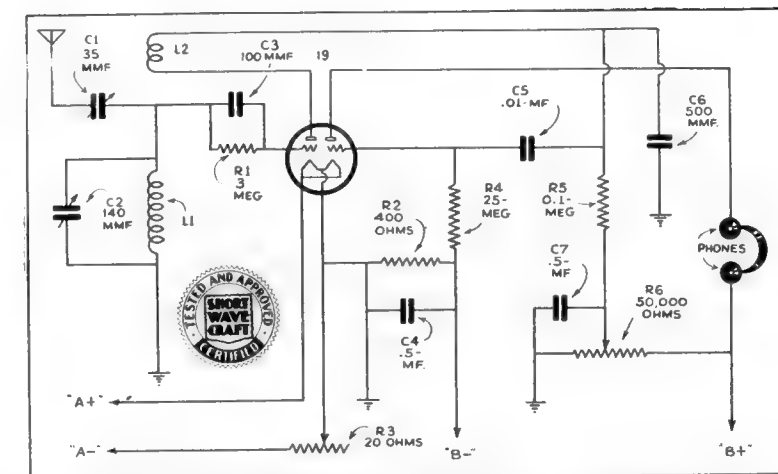
The "19" Twinplex

Parts List

- L1, L2—Octo-Coil Short Wave Coils, 15-200 meters.
 C1—Equalizing condenser 2-35 mmf. EC-3; Hammarlund (National, Cardwell).
 C2—Isolantite midget condenser, 140 mmf., MC-140-M; Hammarlund (National; Cardwell).
 C3—.0001 mf. moulded mica condenser.
 C4, C7—.5 mf. tubular mica condenser, 200 DCWV.
 C5—.01 mf. tubular by-pass condenser, 200 DCWV.
 C6—.0005 mf. moulded mica condenser.
 R1—3 meg. metallized resistor; Lynch.
 R2—400 ohm metallized resistor; Lynch.
 R3—20 ohm rheostat or Amperite 2H-1.
 R4—0.25 meg. metallized resistor; Lynch.
 R5—100,000 ohm resistor; Lynch.
 R6—50,000 ohm potentiometer; Acratest.
 1—Aluminum panel, 7"x5"x1/16"; Blan.
 1—Aluminum subpanel 14 ga., 7"x3 1/4"x1"; Blan.
 1—3" vernier dial; National.
 1—4-prong isolantite socket; Hammarlund (National).
 1—6-prong wafer socket; Alden.
 1—Ant.-ground binding post strip.
 1—Twin speaker jack assembly.
 1—Type "19" tube RCA (Arco).

Operating Hints

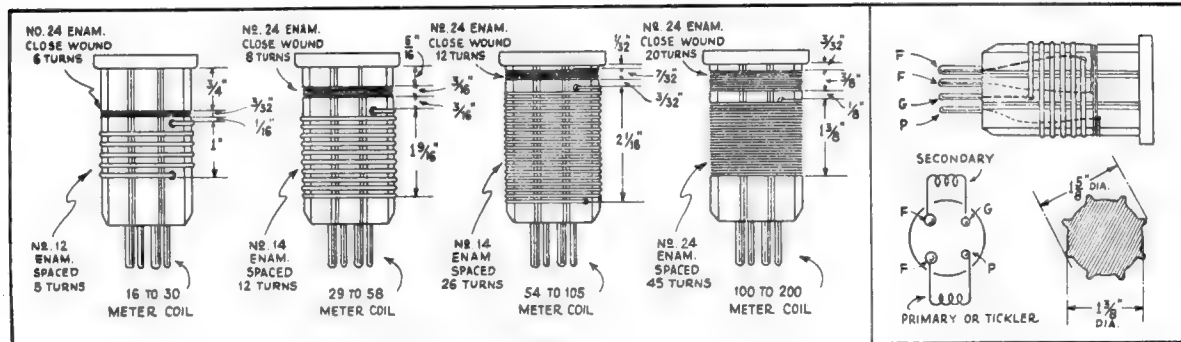
When putting the set into operation the "A" battery should be such that the fila-



ment voltage at the tube socket, is two volts. The potentiometer should be adjusted until the circuit goes into oscillation. When oscillation starts a pronounced thud generally occurs and pronounced clicks will occur when the ungrounded terminal of the

tuning condenser is touched with the finger. It will generally be found advisable to readjust the antenna condenser each time a coil is changed.

—Short Wave Craft, March, 1934.



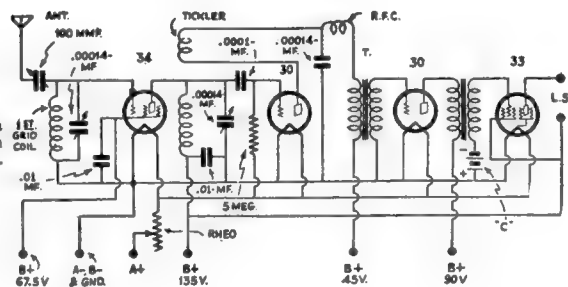
A 4-Tube "Doerle" Set

Constructional Data

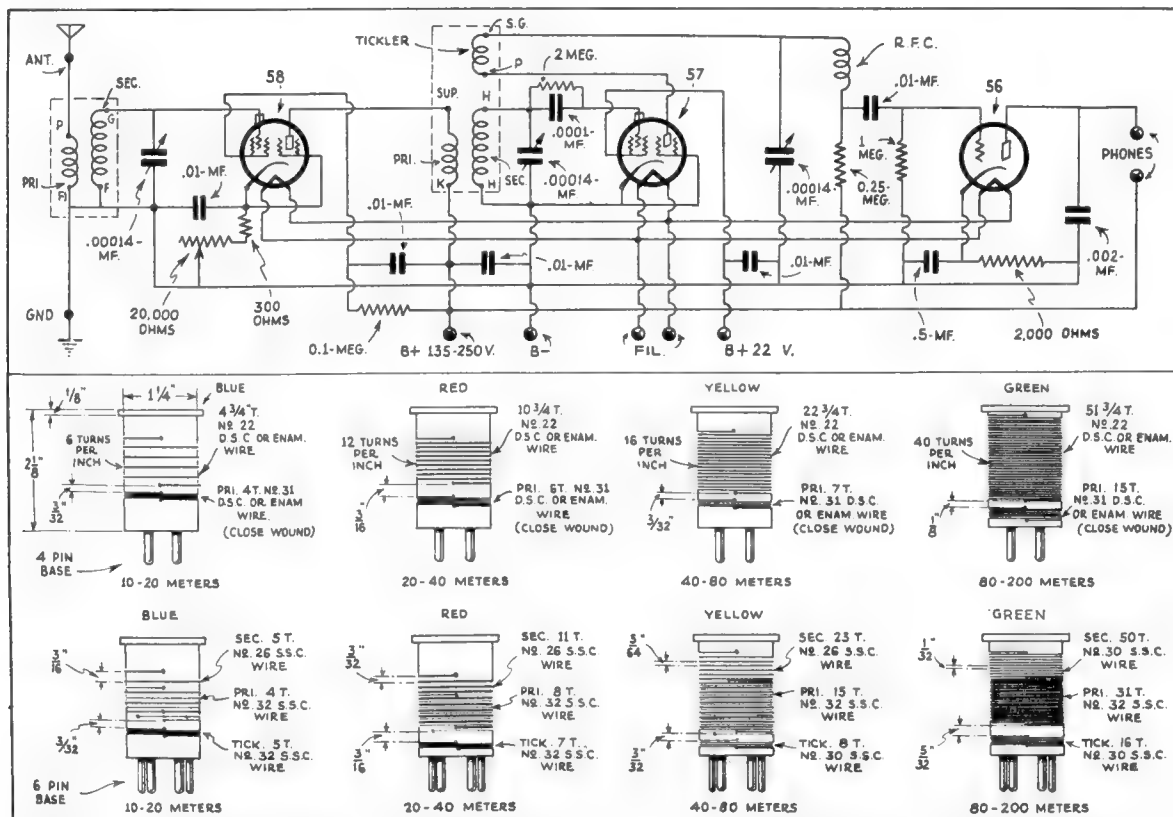
This is a 4 tube model of the famous Doerle receiver employing battery tubes. Standard coils may be used with this receiver. A type 33 pentode is used in the output stage to insure good loudspeaker reception. The filament rheostat may be replaced by an Amperite, type 4-1.

This set is capable of giving very fine results when carefully constructed.

Wiring Diagram for a 4 tube Doerle which gives excellent results.



Doerle 3-Tube "Signal Gripper" Electrified



The set is truly a wonderful short wave receiver. Foreign short-wave stations can be brought in loud enough to operate a speaker even with only a triode (3-element tube) used in the output stage. If a pentode were used greater volume would be obtained, but then head-phones would be out of the picture, and the author just can't seem to break away from phones, which are really the best for "DX" short-wave reception.

This receiver can be operated from various sorts of power supply arrangement and is adaptable to any location whether A.C. power is available or not. For those having A.C. power it is suggested that this set be run from a regular power supply, delivering from 180 to 250 volts with a 2.5 volt filament winding. A 22 volt tap will be required for the screen of the detector tube, of course. It might be well to state here that the voltage applied to the screen should not exceed 22 volts under any consideration, because the sensitivity of the receiver will be very much affected by running the screen at a higher potential. Also the regeneration control will operate smoothly if the voltage is not

of this value. If one wishes to operate this set from batteries it can be done very nicely with no change in the circuit. It's just a matter of changing the tubes to the automobile type and running them from a six-volt storage battery and using "B" batteries for the plate supply. 135 volts will work very nicely, although higher voltage is recommended if full signal strength is to be had. For operating on a regular power supply from 110 volts A.C., a 58 will be needed for the tuned R.F. stage, a 57 for the detector, and a 56 as the output tube. When operating from a storage battery with "B" batteries for the plate supply, a 6D6 will be used for the R.F. tube, a 6C6 for the detector and a 76 for the audio tube.

List of Parts for the "Doerle" 3-Tube A.C. Receiver

- 1—Drilled Metal Chassis, Radio Trading Co.
- 1—R.F. Choke Coil, Radio Trading Co.
- 1—Set of 4 Special Three-Winding Coils, Radio Trading Co.
- 1—Set of 4 Regular Doerle Coils, Radio Trading Co.

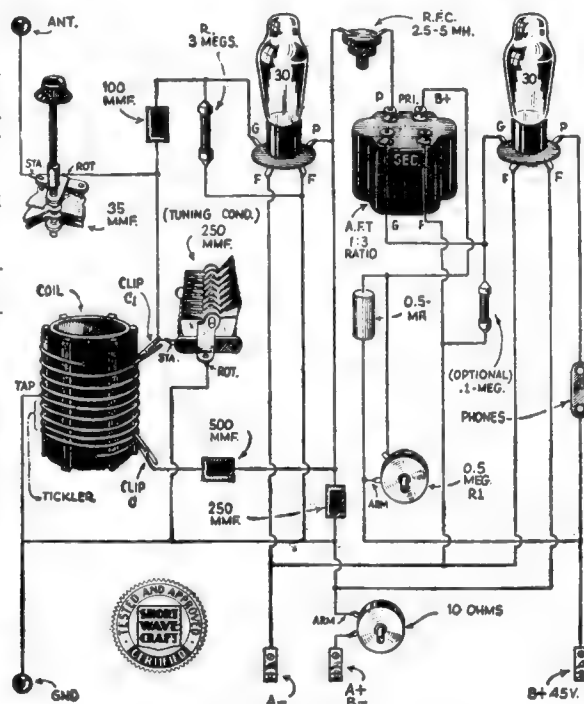
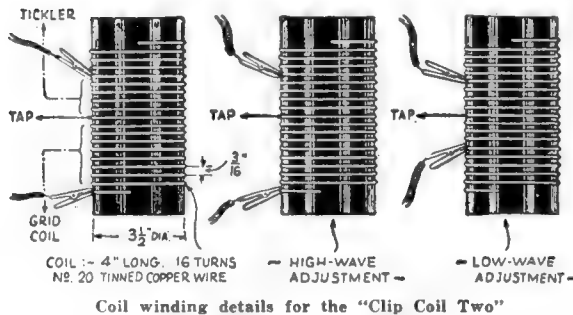
- 5—.01 mf. Fixed Condensers, Flechthelm.
- 1—.002 mf. Fixed Condensers, Flechthelm.
- 1—.5 Bypass Condenser, Flechthelm.
- 1—300 Ohm Resistor.
- 1—100,000 Ohm Resistor, Lynch.
- 1—250,000 Ohm Resistor, Lynch.
- 1—1 Megohm Resistor, Lynch.
- 1—2 Megohm Resistor, Lynch.
- 1—2,000 Ohm Resistor, Lynch.
- 1—2,000 Ohm Resistor, Variable.
- 3—Six Prong Sockets, Eby (National; Hammarlund; Na-ald).
- 1—Five Prong Socket, Eby (National; Hammarlund; Na-ald).
- 1—Four Prong Socket, Eby (National; Hammarlund; Na-ald).
- 2—Triple-Grid Tube Shields, Hammarlund (National).
- 1—.0001 Fixed Condenser, Flechthelm.
- 3—Hammarlund .00014 mf. Tuning Condensers.
- 2—Tuning Dials, National or other make.
- 1—Antenna Ground Terminal Strip, Eby.
- 1—Phone Terminal Strip, Eby.
- 1—Five Wire Cable.

The “Clip Coil Two” Rolls ‘Em In!

Parts List "Clip-Coil" Set

- | | |
|---|--|
| 1—Panel and Baseboard. | 1—5 mf. By-Pass Condenser. |
| 1—Special "Clip-Coil" (see drawing for data). Gen-Win. | Polymet. |
| 1—.00025 mf. Variable Condenser. National (Hammarlund). | 1—500,000 ohm potentiometer. |
| 1—.0001 mf. Mica Condenser. Polymet. | 1—3:1 ratio Audio Transformer. |
| 1—.0005 mf. Mica Condenser. Polymet. | 2—4-prong Tube Sockets. |
| 1—3 megohm Grid-Leak, $\frac{1}{2}$ watt. Lynch. | 1—Antenna Ground Terminal Strip. |
| | 1—Phone Terminal Strip. |
| | 1—2.5 mh. R.F. Choke. National (Hammarlund). |
| | 2—230 RCA Radiotrons (Arco). |

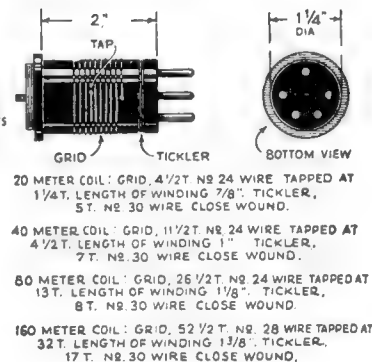
Short Wave Craft, July, 1934.



The DOERLE Goes “Band-Spread”

PARTS LIST—2-TUBE DOERLE BAND- SPREAD

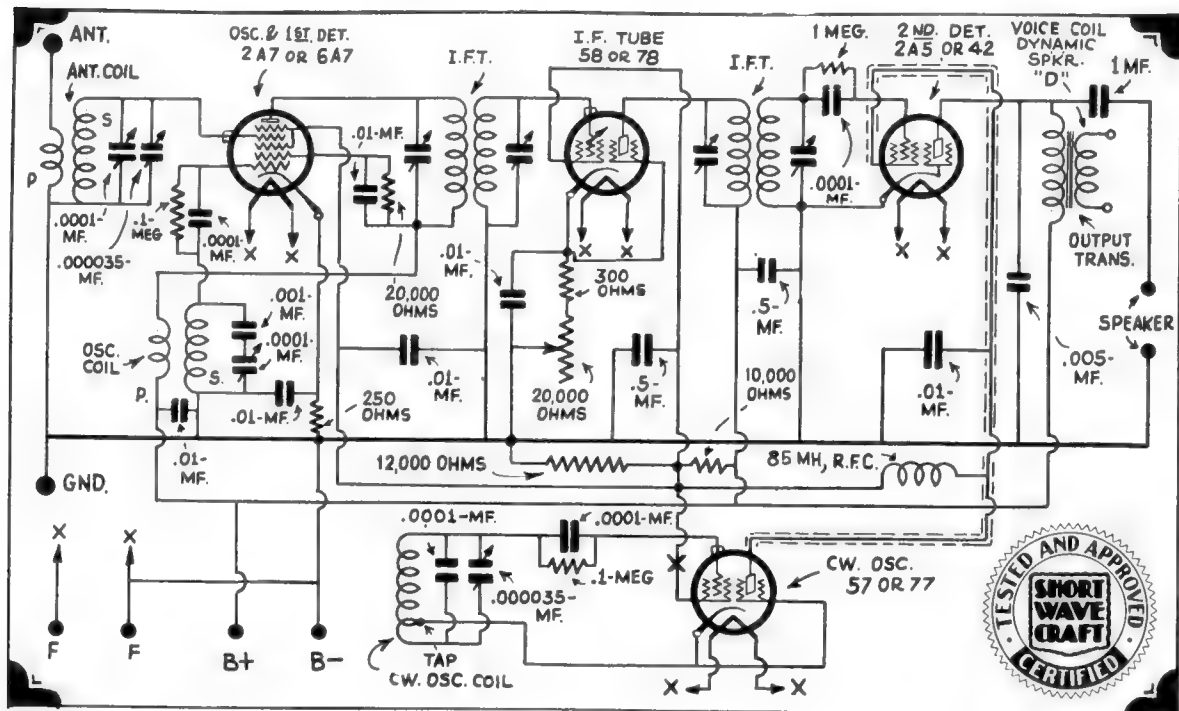
-
- 1—set of Na-Ald "band-spread" coils.
- 1—drilled metal chassis. Radio Trading Co.
- 2—140 mmf. variable tuning condensers. Hammarlund. (National; I.C.A.).
- 1—antenna trimmer (low min. cap.) 35 mmf max.
- 1—.0001 mf. mica condenser. (Polymet.)
- 1—.01 mf. bypass condenser. I.C.A. (Polymet.)
- 1—.02 mf. bypass condenser. I.C.A. (Polymet.)
- 1—.002 mf. bypass condenser. I.C.A. (Polymet.)
- 1—20 to 25 mf. 25-volt electrolytic condenser. (Polymet.)
- 1—2 meg. grid-leak. Lynch.
- 1—1 meg. grid-leak. Lynch.
- 1—250,000 ohm resistor. Lynch.
- 1—2,000 ohm resistor. Lynch.
- 1—50,000 ohm variable potentiometer. Acrastrate. (I.C.A.)
- 1—2.5 to 5 mh. R.F. choke. National (Hammarlund; I.C.A.)
- 1—5-prong wafer socket. Na-Ald. (I.C.A.)
- 2—6-prong wafer-socket. Na-Ald. (I.C.A.)
- 1—antenna-ground terminal strip. I.C.A.
- 1—phone terminal strip. I.C.A.



- 1—5-wire battery cable. I.C.A.
1—57 tube, R.C.A. (Arco.).
1—2A5 tube, R.C.A. (Arco.).

—*Short Wave Craft, May, 1934.*

This 3-Tube "Super" Has "IT"



Coil Winding Table

Make two of the following

COIL	Tickler or antenna	GRID
No. 1—	4 turns No. 34 wire	5 turns No. 26 wire
No. 2—	5 turns No. 34 wire	10 turns No. 26 wire
No. 3—	8 turns No. 34 wire	24 turns No. 26 wire
No. 4—	10 turns No. 34 wire	45 turns No. 26 wire

All coils close-wound, Diameter of form 1½ inch.

The above coils cover all of the popular S. W. broadcast and Amateur bands.

Any standard commercial SW coils will work if designed for 100 mmf. condensers. Otherwise change tuning condensers to match coils that are designed to work with 140 mmf. condensers.

Spacing between grid coils and tickler or antenna coil is ¼ inch.

Parts List—Shuart 3-Tube Superhet

- 1—8x12x1 Inch Chassis 1/16 in. Blan.
- 1—7x12 Inch Panel 1/16 in. Blan.
- 1—drum dial—National.
- 1—100 mmf. Variable Condenser, Clockwise, National—270°.
- 1—100 mmf. Variable Condenser, Counter Clockwise, National—270°.
- 2—35 mmf. Variable Condensers, Hammarlund.

- 8—5 Prong coil forms, small Hammarlund.
- 2—National Isolantite sockets (5 prong).
- 1—National Isolantite socket (7 prong).
- 2—National "Airtuned" IF Transformers
- 3—Tube shields, Hammarlund.
- 3—6 prong tube sockets, wafer, Eby.
- 2—.5 MF Bypass condensers.
- 1—.5 MF Bypass condenser.
- 7—.01 MF. Bypass condensers.
- 3—.0001 MF. Mica grid cond.
- 1—22,000 ohm voltage divider, tapped at 12,000.
- 2—100,000 ohm resistors—1 watt, Lynch International).
- 1—20,000 ohm resistor—1 watt, Lynch, (International).
- 1—300 ohm resistor—1 watt, Lynch, (International).
- 1—250 ohm resistors—1 watt, Lynch (International).
- 1—1 meg. resistor—1 watt, Lynch (International).
- 1—20,000 ohm Volume control, Acratest.
- 1—Antenna-Ground binding post strip, Eby.
- 1—Speaker binding post strip, Eby.
- 1—4 wire cable.
- 1—2A7 or 6A7 tube, Gold Seal.

- 1—2A5 or 42 tube, Gold Seal.
- 1—58 or 78 tube, Gold Seal.
- 1—57 or 77 tube, Gold Seal.

Tube Line-up

The line-up of the tubes is as follows: the 2A7 is used as the frequency converter, a type 58 for the intermediate frequency amplifier, and a type 2A5 as the second detector tube. The type 2A5 used as the second detector gives sufficient audio amplification to operate a speaker, either magnetic or dynamic, at regular speaker volume. That is, any of the major shortwave stations can be heard all over the house and one does not have to stand with one's ear in the speaker either. The fourth tube, the type 57, is the beat oscillator tube and plays no part in the reception of broadcast (phone) reception, other than to aid in tuning or locating the station. The coils used in this receiver are very easy to construct; they are all close-wound and the two sets, that is, the first detector and the oscillator coils are identical in number of turns. The coils used in the set shown are wound on small isolantite forms. Complete coil data is given in the appended "Coil table."

—Short Wave Craft, Sept., 1933.

Short Wave Thrills on 2 Tubes

Coil Data

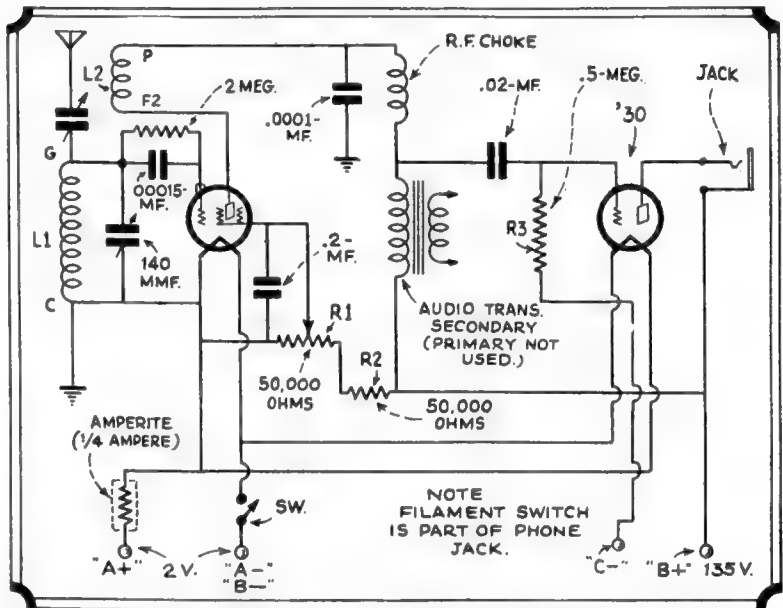
The coil forms have 5 prong bases. They have an outside diameter of $1\frac{1}{2}$ inches and a length of $2\frac{1}{2}$ inches.

	Grid winding (L1)	Tickler (L2)
14.5-28 meters,	$3\frac{1}{4}$ turns	5 turns
27.5-53 meters,	$7\frac{1}{2}$ turns	6 turns
51-100 meters,	$16\frac{1}{2}$ turns	7 turns
99-200 meters,	$46\frac{1}{2}$ turns	15 turns

All tickler windings are $\frac{1}{8}$ inch below the grid windings. No. 24 D. S. C. wire is used.

Parts List

- 1—140 mmf. variable condenser (Hammarlund midget).
- 2—UX type sockets.
- 1—UY type socket (for coil).
- 1—R. F. Choke (short wave type; about 85 M. H.).
- 1—50,000 ohm potentiometer.
- 1—50,000 ohm, 1 watt resistor, R2.
- 1—.2 mf non inductive condenser.
- 1—.02 mf. cond.
- 1— $\frac{1}{2}$ meg. fixed resistor, R3.
- 1—Amperite ($\frac{1}{4}$ ampere type) with mounting.
- 1—3 megohm grid-leak.
- 1—.00015 mf. variable condenser.
- 1—.001 mf. mica condenser.
- 1—Screen grid clip.



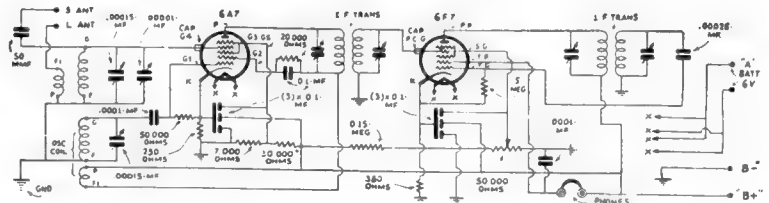
- 1—Single Circuit jack, with extra switch closed when phone plug is in.
- 2 ft. of bus bar wire.
- 1—Roll of flexible insulated wire.
- 1—audio transformer (primary not used.)
- 4—Fahnstock connectors.
- 1—4 inch vernier dial.
- Hardware, etc.
- 1—Type 32 tube (RCA Radiotron).
- 1—Type 30 tube (RCA Radiotron).

Victor 2 Tube Super-Heterodyne

Parts for 2-Tube Superhet

Two sets of standard S-W receiving coils Na-ald (or equivalent).

- 1—2-gang .00015 mf. variable condenser National (Hammarlund).
- 1—.000015 mf. variable condenser (Trimmer), National (Hammarlund).
- 1—.00075 mf. fixed mica condenser.
- 2—.0001 mf. fixed mica condensers.
- 1—.00025 mf. fixed mica condenser.
- 1—.1 mf. bypass condenser (Flechtheim).
- 2—3x0.1 mf. bypass condensers (Flechtheim).
- 2—465 kc. intermediate transformers, GenWin (Acratest, National, Hammarlund).
- 1—50,000 ohm, 1 watt resistor, Lynch (International).
- 1—250 ohm, 1 watt resistor, Lynch (International).
- 1—7,000 ohm, 1 watt resistor, Lynch (International).
- 1—30,000 ohm, 1 watt resistor, Lynch (International).
- 1—150,000 ohm, 1 watt resistor, Lynch (International).
- 1—350 ohm, 1 watt resistor, Lynch (International).



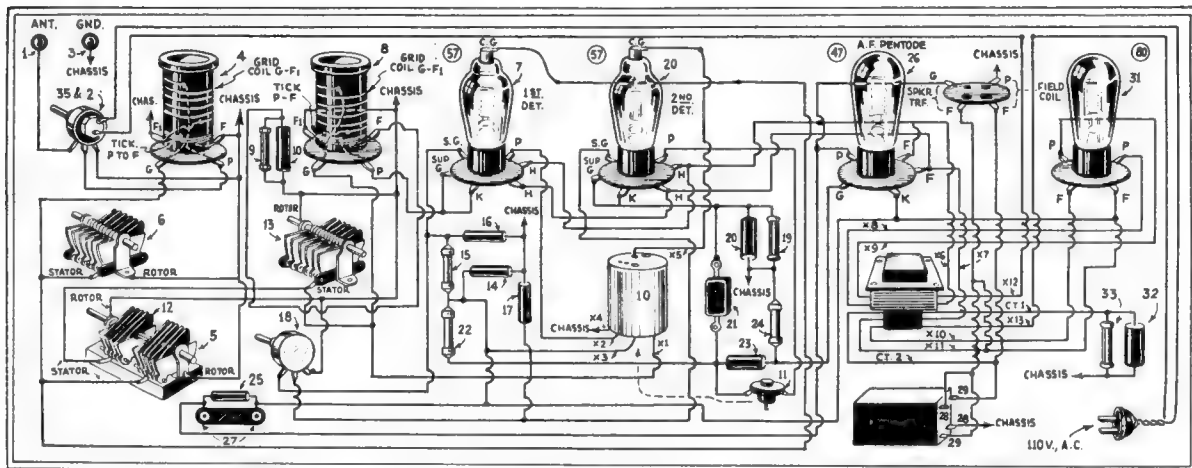
- 1—500,000 ohm, 1 watt resistor, Lynch (International).
- 1—20,000 ohm, 1 watt resistor, Lynch (International).
- 1—50,000 variable potentiometer, wire-wound. Acratest.
- 1—2A7 wafer socket. Eby, Na-ald.
- 1—6F7 wafer socket. Eby, Na-ald.
- 2—4 prong wafer sockets. Eby, Na-ald.
- 1—antenna ground strip. Eby.
- 1—phone output plug. Eby.

- 1—4 wire battery cable.

To "line up" the I. F. transformers connect the aerial and ground and plug-in the 160 meter coils. The transformers are usually "peaked" at the factory so that it is fairly certain that some stations will be heard while tuning over the dial. If no station is heard, some device that produces interference, such as a buzzer or a fan, can be used to adjust the intermediate transformers. Leave the first I.F. condenser alone but adjust the other three for maximum volume.

—Short Wave Craft, Dec., 1933.

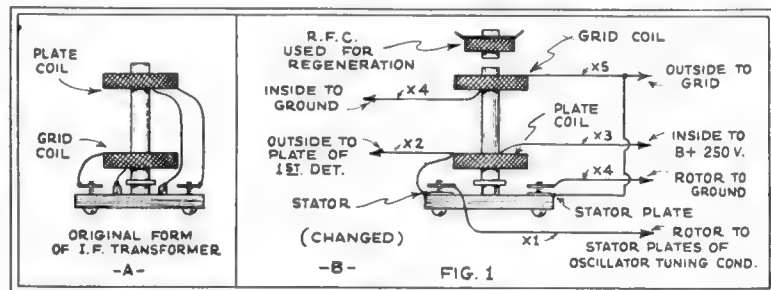
A 4-Tube Super-Het



"Low price" and "smooth control" are two of the outstanding features demanded in any radio receiver today. Mr. Denton, well-known to all of our readers for the many excellent designs he has offered in the past, has solved the riddle of providing the following features in a low-priced, yet efficient 4-tube superhet: single dial tuning, band-spread, regeneration for C. W. reception and increased sensitivity, pentode output, complete A.C. operation and provision for phones as well as loud speaker.

Parts List

One Hammarlund MC35X Dual tuning condenser .35 mmf. capacity (5, 12).
Two Hammarlund MC 100 M, 100 mmf. midget condenser, (6, 13).
One National Velvet Vernier Dial. Type B Dual Range.
Two National Screen grid clips.
Two National Tube Shields Type T58 (Hammarlund).
One Blau Special Chassis. Aluminum, drilled and folded.
One Eby antenna ground terminal (1, 3) (Cinch).
One Eby phone terminal strip. (27.)
One Acra-test 10,000 ohm potentiometer and power switch 2, 35) T(type 6169 (Clarostat).



One Acra-test 50,000 ohm. potentiometer, Type 6156 (18) (Clarostat).
Two sets of Na-ald short-wave coils.
Three four prong sockets, wafer type. (4, 8, and speaker connector) Alden.
One four prong wafer socket marked 280. (31) Alden.
Two six prong wafer sockets, (7, 20) Alden.
One five prong wafer socket, (26) Alden.
One 1800 ohm field dynamic speaker with output transformer for single pentode, (30).
One Flechtheim Superior Electrolytic condenser Dual 8 mf. (28, 29) (Concourse).
Four Flechtheim Tubular Condensers. .09 mf. 1000 volts Type Az-27. (14, 16, 17, 19).
Two Flechtheim Tubular Condensers. .01 mf., 1000 volts. Type Az-17. (10, 23).
One Flechtheim Tubular Condenser. .006 mf., 1000 volts, (25).
One R.F. Choke, Blau special (11).
Gen-win 465 kc. I.F. Transformer (10).
One Acme four-tube, power transformer (34) (Franklin).
Two International resistors, One watt, 25,000 ohms (9, 19) (Lynch).
One International resistor, 1 watt, 75,000 ohms (15) (Lynch).
One International resistor, 1 watt, 300,000 ohms (22) (Lynch).
One International resistor, 1 watt, .5 meg. (24) (Lynch).

One Acra-test, 2 watt resistor, 400 ohms. (33) (Lynch).
One Acra-test mica condenser. .001 mf. (21) (Polymet).

Names given in parentheses indicate other makes of apparatus which may be used.

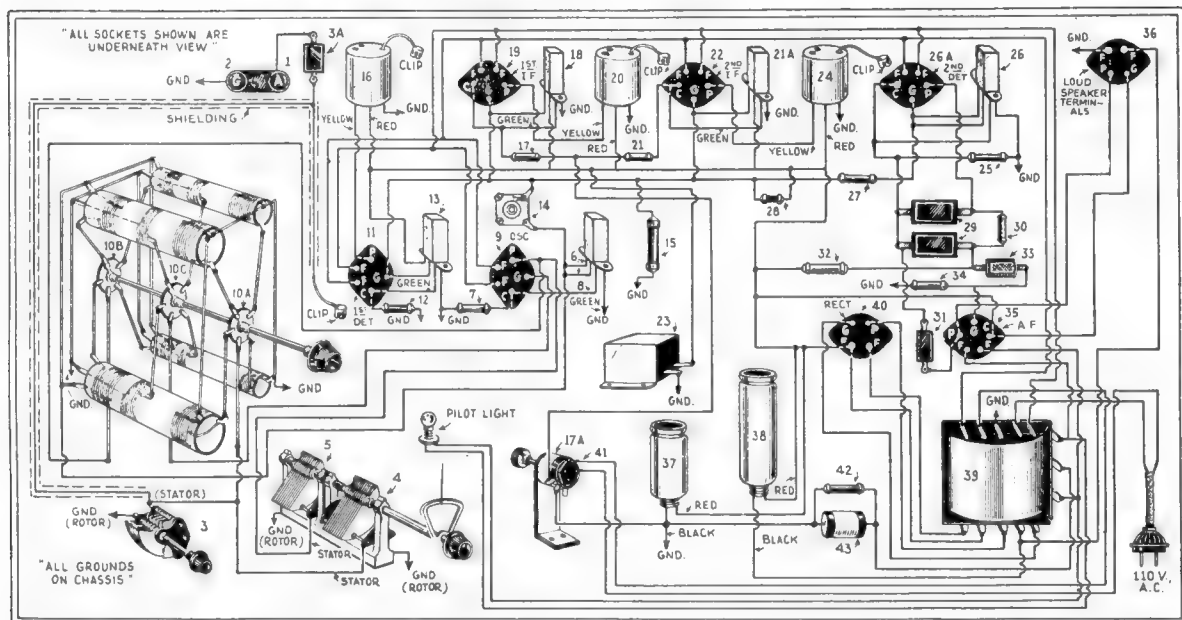
Band-spreading action is provided by means of the two tank and the two tuning condensers. The two tuning condensers have a capacity of 35 mmf. each and the tank condensers have a capacity of 100 mmf. each. Thus, the tank condensers can be set for a portion of a band and the tuning accomplished by means of the two tuning condensers. While this method of band-spreading with the coils and condensers used leaves something to be desired along this line satisfactory action will be obtained on all frequencies except the extremely high ones.

Regeneration in the second detector aids in two respects; it sharpens tuning and increases the sensitivity to a marked degree. If it is desired to receive C.W. signals then the second detector can be left oscillating. For tuning in weak signals tune the set and adjust the regeneration control so that the station whistle is audible. Then turn the regeneration control back until the speech or music clears up.

—Short Wave Craft, Mar., 1933.

The Denton S-W Plugless Superheterodyne

CLIFFORD E. DENTON

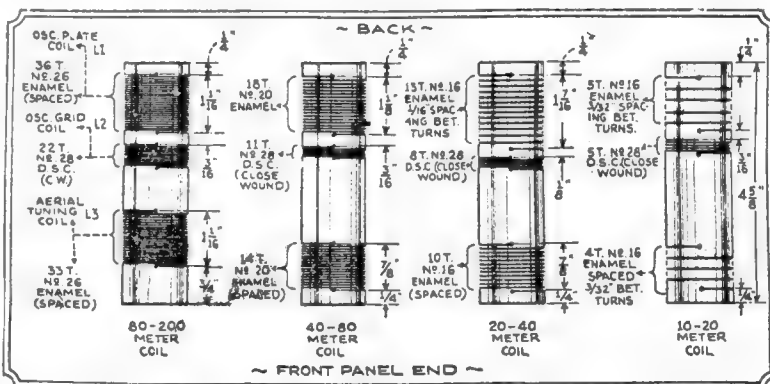


Parts List for Super-het

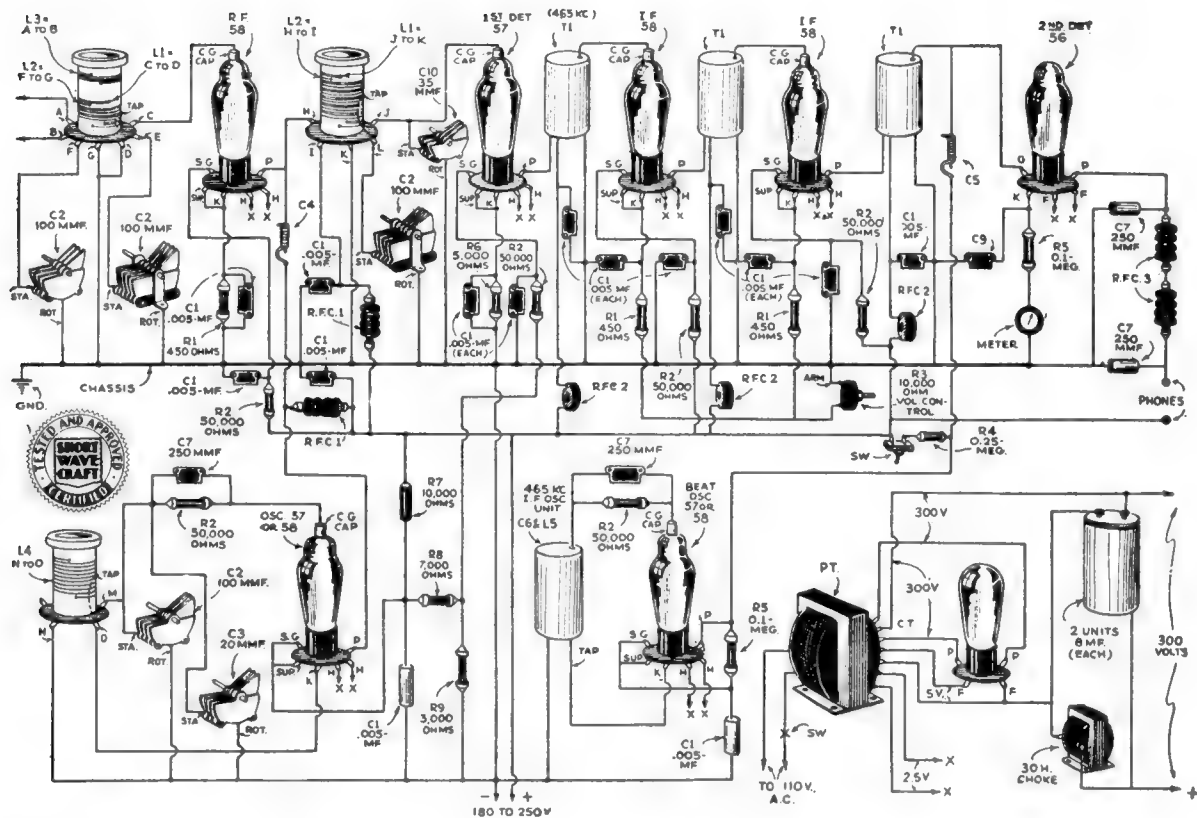
- 1—Eby Antenna Ground Post (1, 2)
- 1—Best S.W. C.1 kit (10A, 10B, 10C) coil and switch assembly.
- 2—National tuning condensers (4, 5).
- 1—Pilot 80 mmf. trimming condenser (3).
- 8—Eby wafer sockets marked for tubes (9, 11, 19, 22, 26A, 35, 36, 40).
- 5—Blan .1 mf. by-pass condensers, 2 in each can (6, 8, 13, 18, 21A, 26).
- 1—Electrad volume control and fil. switch R1-202-P (17A, 41).
- 1—International or Lynch resistor, 2500 ohms, 1 watt (7).
- 1—International or Lynch resistor, 10000 ohms, 1 watt (15).
- 1—International or Lynch resistor, .1 meg., 1 watt (32).
- 1—International or Lynch resistor, .5 meg., 1 watt (34).
- 2—International or Lynch resistors, 500 ohms, 1 watt (17, 21).
- 2—International or Lynch resistors, 25000 ohms, 1 watt (12, 25).
- 3—International or Lynch resistors, 10000 ohms, 1 watt (30, 15, 27).
- 1—International or Lynch resistor, 416 ohms, 1 watt, (42).
- 1—International or Lynch resistor, 50000 ohms, 1 watt (28).
- 3—Acratest 465 K.C. I.F. transformers (16, 20, 34).
- 1—Blan R.F. choke (14).
- 1—Flechtheim Filter Condenser 2 mf. 450 volts (23).
- 1—Sprague midget condenser .04 mf. (33).
- 2—Aerovox .000125 mica condensers (29).
- 1—Aerovox .001 mica condenser (31).
- 4—Hammarlund tube shields.
- 1—Acratest power transformer 2532 (39).
- 2—Acratest Electrolytic condensers (1-8 mf. No. 5308 and 1-4 mf. No. 5304) (37, 38).
- 1—Blan chassis and volume control m.t.g. bracket, completely drilled and folded.
- 1—Crowe "full vision" dial and light holder.
- 1—G.E. power cord and plug.
- 1—Acratest 25 volts, 25 mf. No. 6646 (43).
- 1—Raytheon 280 tube.
- 1—Raytheon 247 tube.
- 2—Raytheon 224 tubes.
- 2—Raytheon 224 tubes.
- 2—Raytheon 235 tubes.
- 1—Raytheon 227 tube.
- 1—loud-speaker with output transformer for '47 pentode, with 1800 ohm field.
- 1—Blan 4 wire plug and beads for speaker cable.

In the event that the builder wishes to use an ordinary loud-speaker, he may procure a pentode output transformer having a secondary of low impedance to match the average speaker.

—June, 1932, Short Wave Craft.



The "Globe-Girdler 7"



Parts List

- 15—(C1) .005 mf. fixed condensers.
 3—(C2) .0001 mf. midjet variable condensers, National, (Hammarlund).
 2—(C3) 20 mmf. variable midjet condensers, National, (Hammarlund).
 C4, (C5) Special condensers—see text.
 1—(C6) padding condensers of I.F. transformer.
 4—(C7) .00025 mf. mica condensers.
 2—(C8) 8 mf. electrolytic condensers.
 1—(C9) 1 mf. paper by-pass condenser.
 1—(C10) 35 mmf. Hammarlund No. 35 condenser.
 2—(R1) 450 ohm, 1 watt resistors (R1), Lynch, (International).
 6—(R2) 50,000 ohm, 1 watt resistors, Lynch, (International).
 1—(R3) 10,000 ohm volume control, Acra-test, (R. T. Co.).
 1—(R4) 250,000 ohm 1/2 watt, Lynch, (International).
 2—(R5) 100,000 ohm, 1/2 watt resistors, Lynch, (International).
 1—(R6) 5000 ohm, 1/2 watt, Lynch, (International).
 1—(R7) 10,000 ohm, 1 watt resistor.
 1—(R8) 7000 ohm, 1 watt resistor, Lynch, (International).
 1—(R9) 3000 ohm, Lynch, (International).
 1—(RFC1) National R.F. Choke, 2.5 M.H.
 2—(RFC2) Hammarlund SPC. 10 M.H.

- 2—(RFC3) 800 turn "universal" wound, 85 MH.
 3—(T1) 465 kc. I.F. transformers, National, (Hammarlund), Gen-Win.
 2—National drum dials.
 6—Coil forms, National.
 6—6-prong sockets, National.
 1—5-prong socket, National.
 6—Tube shields, National.
 2—Coil sockets 6 prong, National.
 1—Coil socket, 5 prong.
 1—Power transformer 300-0-300, 5V, 2.5 V., National, (R. T. Co.).
 1—4-prong socket for 280, National.
 1—30 henry filter choke (60 ma.), National, (R. T. Co.).
 4—Type 58 tubes, R. C. A. (Arco).
 2—Type 57 tubes, R. C. A., (Arco).
 1—Type 56 tube, R. C. A., (Arco).
 1—Type 80 tube, R. C. A., (Arco).

L1—is tapped for band spread: as the tap is taken off nearer the ground end of the grid coil, the band-spreading increases. About 1/2 distance from the ground end gives best results. L4, the local oscillator coil, is tapped to obtain oscillation; this tap should be taken off 1/4 the distance from the ground end of the coil. L5 is made from one of the coils removed from an old 465 KC. I.F. transformer. Remove about 30 turns; solder on a tap at this point and wind back the wire previously removed. This coil should be connected into the circuit so that the tap at 30 turns is brought next to the grounded end of the coil.

cuit so that the tap at 30 turns is brought next to the grounded end of the coil.

The RF chokes and IF transformers should be good ones. The chokes arrived at were found the best possible and the IF transformers used have large coils and the smallest padding condensers conveniently possible. It is admitted that mica is inferior to air for dielectric but if one manages to use a minimum of mica in the padding condensers, i.e., two plates separated by one sheet of mica, there will be approximately one-fourth the possible variation where four plates separated by two sheets of mica are used.

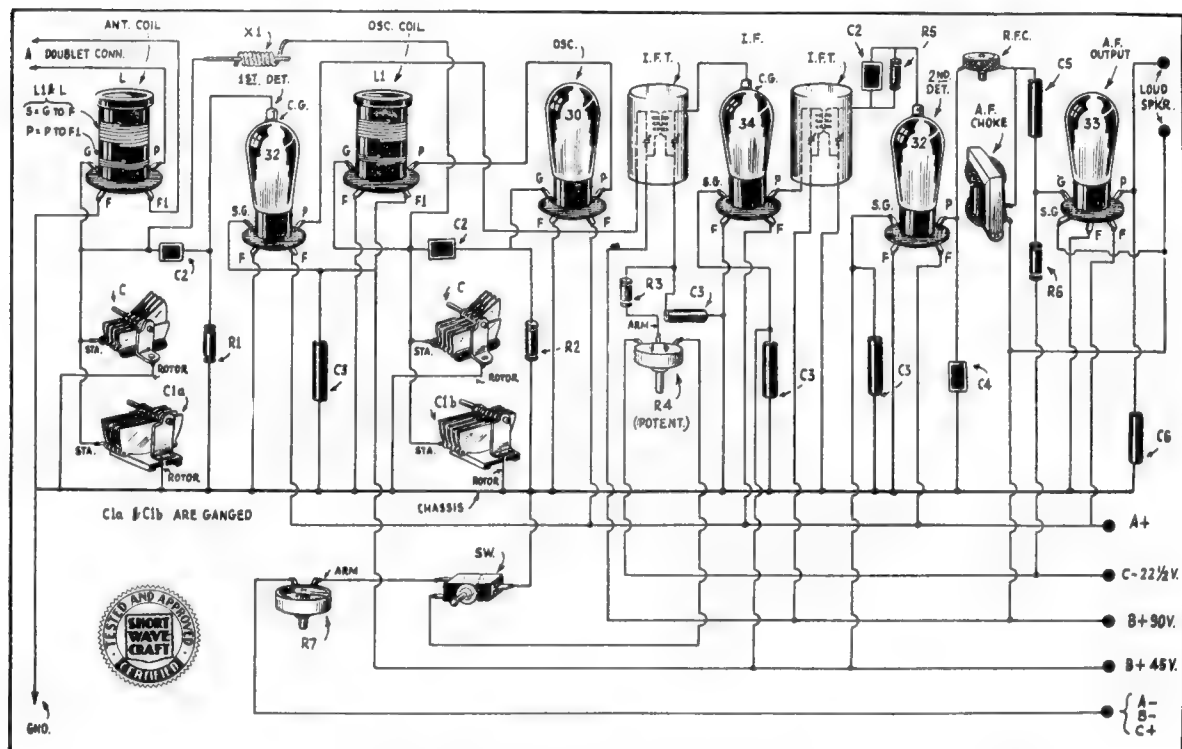
The beat oscillator plate lead, shielded except for about one and one-quarter inches on one end, is coupled to the grid of the 56 detector by wrapping the unshielded portion around the grid lead of the 56 2nd detector. This method of coupling is very effective and the strongest C.W. signal can be heterodyned. (This is C4, C5 on the diagram.)

COIL DATA

80 M.	40 M.	20 M.
L1 30T.	13T.	6T. (tapped)
L2 20T.	8T.	4T.
L3 8T.	5T.	4T.
L4 20T.	12T.	5T. (tapped)
L5 (see text)		

—Short Wave Craft, Feb., 1934.

The "Rex" Portable Super-het



Plug-In Coil Data

Meters Wave-length	Grid coil turns	Tickler turns	Distance between 2 coils
200-80	52 T. No. 28 En. Wound	19 T. No. 30 En. Close wound (CW)	$\frac{1}{4}$ "
80-40	32 T. per inch Wound	23 T. No. 28 En. C. W.	$\frac{1}{8}$ "
40-20	16 T. per inch Wound	11 T. No. 30 En. C. W.	$\frac{1}{8}$ "
20-10	5 T. No. 28 En. Wound	7 T. No. 30 En. C. W.	$\frac{1}{8}$ "

Coil form— $2\frac{3}{8}$ " long by $1\frac{1}{4}$ " dia. 4-pin base.

"REX" Portable Superhet

2 sets of Alden plug-in SW 2-Winding coils (L, L1).

1—Hammarlund 35 mmf. dual cond. (C1).

2—Hammarlund 100 mmf. cond. (C).

2—Hammarlund 465 kc. I.F. trans. (IFT).

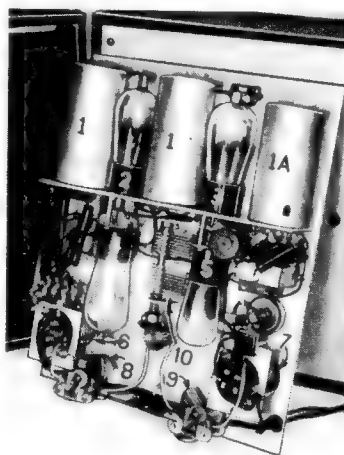
3—Acratest .0001 mf. mica condensers (C2).

4—Tubular cond. .01 mf. (C3).

1—Acratest .00025 mica cond. (C4).

1—Tubular cond. .015 mf. (C5).

This portable super-het employs two volt battery tubes. Band-spread is included among other features and economy is assured by the use of five tubes.



Rear View of "Rex" Chassis.

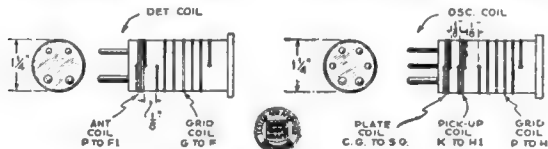
- 1—Acratest .002 mf. mica cond. (C6).
- 2—32 type wafer sockets, Eby (Na-ald).
- 1—30 type wafer sockets, Eby (Na-ald).
- 1—33 type wafer sockets, Eby (Na-ald).
- 1—34 type wafer sockets, Eby (Na-ald).
- 2—plain 4 prong wafer sockets, Eby (Na-ald).
- 1—Acratest 3 meg. $\frac{1}{2}$ watt resistor (R1).
- 2—Acratest 1 meg. $\frac{1}{2}$ watt resistor (R5, R6).
- 2—Acratest 5 meg. $\frac{1}{2}$ watt resistor (R2, R3).
- 1—"dual" circuit-closing toggle switch (S).
- 1—Acratest 6 ohm rheostat (R7).
- 1—Acratest potentiometer, 50,000 ohm (R4).
- 1—Acratest 800 henry choke (A. F. C.).
- 1—5" diameter magnetic loud speaker; 7000 ohms impedance.
- 1—carrying case.
- 2—Special panels: Aluminum (drilled as per drawings)
- 1—special hardware kit.
- 1—National 3" vernier dial.
- 4—1" small black knobs.
- Wire, soldering lugs, etc.

—Short Wave Craft, Oct., 1933.

Mitchell 7-Tube Super-Het.

— COIL DATA —

RANGE METERS	DET. OIL		WIRE USED ↓	OSC. COIL		
	ANT.	SEC.		PLATE.	GRID.	PICK-UP
10-20	4 TURNS CLOSE WOUND	4 TURNS SPACED 3/8"	ALL GRID = NO 24 D.S.C. ANT. PLATE, AND BIPUP COILS = NO 30 D.S.C	4 TURNS CLOSE WOUND	5 TURNS SPACED 3/16"	2 TURNS CLOSE WOUND
20-40	7 TURNS 11 TURNS	7 TURNS 11 TURNS		7 TURNS CLOSE WOUND	11 TURNS SPACED 1/8"	2 TURNS CLOSE WOUND
40-80	7 TURNS 16 TURNS	23 TURNS SPACED 1/8"		7 TURNS CLOSE WOUND	13 TURNS SPACED 1/16"	3 TURNS CLOSE WOUND
80-200	16 TURNS CLOSE WOUND	50 TURNS SPACED 1/32"		16 TURNS CLOSE WOUND	50 TURNS SPACED 1/32"	4 TURNS CLOSE WOUND



List of Parts

- Chassis and Panel
- 1—Set Na-alad 2 winding, 4 pin S-W plug-in coils.
- 1—Set special 3 winding, 6 pin S-W plug-in coils.
- 5—Tube Shields, National (Hammarlund).
- 3—465 Kc. I.F. Transformers, National; (Gen.-Win.; Hammarlund.)
- 1—2 gang .00015 mf. variable condenser, National.
- 1—.000025 mf. midget variable condenser, National.
- 1—.001 mf. padding condenser. Hammarlund.
- 1—.00035 mf. mica condenser.
- 1—.00025 mf. mica condenser.
- 1—.01 mf. 400 v. coupling condenser.
- 10—.1 mf. bypass condensers. Flechtheim.

- 1—7 prong socket Eby (Na-ald).
- 1—10,000 ohm potentiometers—Acratest.
- 2—350 ohm 1 watt resistors, Lynch (International).
- 1—400 ohm 5 watt resistor, Lynch (International).
- 1—500 ohm 1 watt resistor, Lynch (International).
- 2—25,000 ohm 1 watt resistors, Lynch (International).
- 2—30,000 ohm 1 watt resistors, Lynch (International).
- 2—250,000 ohm $\frac{1}{2}$ watt resistors, Lynch (International).
- 1—Antenna-Ground terminal strip.
- 1—A.C. line switch.
- 1—650 volt C. T. power transformer, Radio Trading Co.
- 1—Dynamic speaker and plug, with output transformer for '99 tube, R. T. Co.

- 1—25 mf. 50 volt electrolytic condenser. R. T. Co.
1—A.C. line cord and plug.
Necessary knobs, wire, hardware, etc.

Tubes

- | | | |
|--|-------------|--|
| tic | condensers. | 1—'56 type tube, Gold Seal, Arco, Van |
| R. T. Co. | | Dyke. |
| 1—10 millihenry R. F. choke, (Hammarlund)*. | | 2—'57 type tubes, Gold Seal, Arco, Van |
| | | Dyke. |
| 1—80 millihenry R. F. choke, National (Hammarlund)*. | | 2—'58 type tubes, Gold Seal, Arco, Van |
| | | Dyke. |
| 1—High ratio tuning dial. | | 1—'59 type tube, Gold Seal, Arco, Van |
| | | Dyke. |
| 1—5 prong socket Eby (Na-ald). | | 1—'80 type tube, Gold Seal, Arco, Van |
| | | Dyke. |
| 3—4 prong socket Eby (Na-ald). | | *Choose the nearest standard size.— |
| | | Editor. |
| 5—6 prong socket Eby (Na-ald). | | —Short Wave Craft, Dec., 1933. |
-
- A SOUTH AMERICAN 7-TUBE
SUPER-HET.**

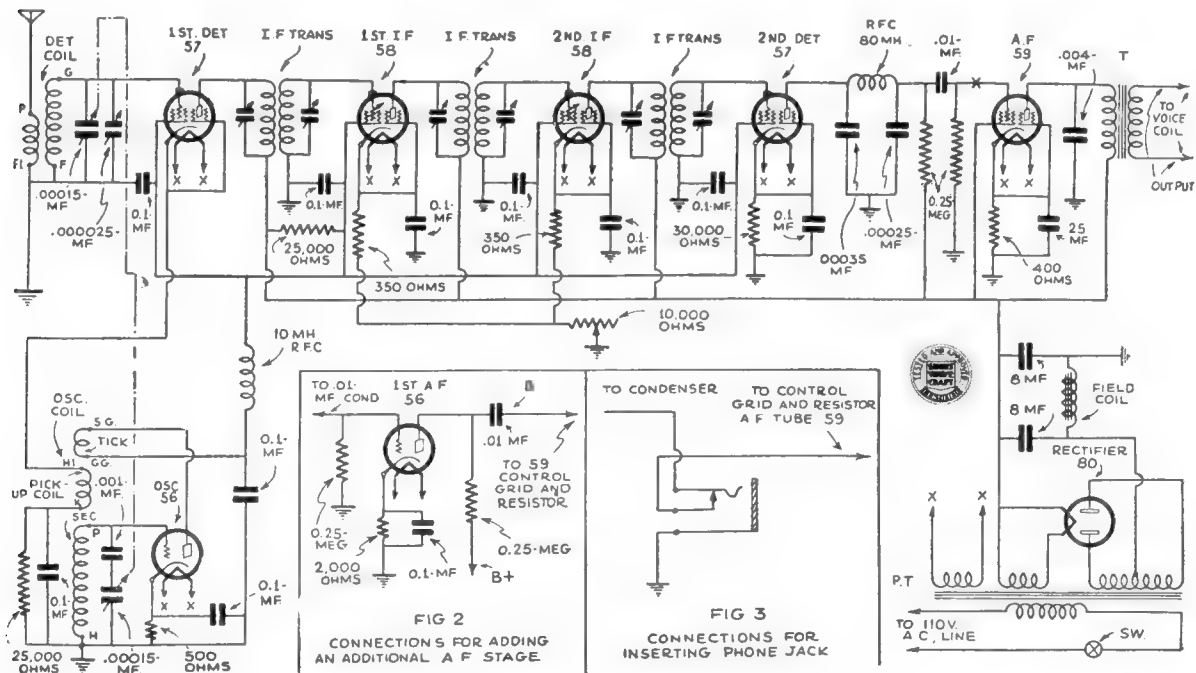
—*Short Wave Craft, Dec., 1933.*

A SOUTH AMERICAN 7-TUBE
SUPER-HET.

(Continued from last page)

- 1—Silver-Marshall No. 255 audio transformer, A.T.
1—Front panel, bakelite or aluminum 20.5 inches long and about eight inches high (or to suit your cabinet) Blan.
7—tubes; 2—27 type; 2—24 type; 3—35 type.
9—tube sockets, 5-prong—Na-ald.
6—Binding posts, Eby.
- The grid leaks R7, R8, R9 and R10 are very important. I am now using R7—20,000 ohms; R8—125,000; R9—125,000; and R10—1 megohm. The builder should try different values and each change will give different results. Usually the I.F. tubes will oscillate if the resistances are too high. Don't forget this point as it is very important.

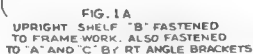
—*Short Wave Craft*, April, 1933.



"Ultra Seven" Portable All-Wave Super-Het.

Complete List of Parts Required for the PoPrtable "Ultra-Seven" Superhet

- 3—Hammarlund midget variable condensers, .0002-mf., type MC-200M (3, 10, 15).
 - 1—Hammarlund midget variable condenser, .00008-mf., type MC-75M (4).
 - 1—Hammarlund padding condenser, 700 to 1,000 mmf. type MICS-10000 (78).
 - 8—Hammarlund isolantite short-wave coil forms, 6-prong, type CF-6. (Four sets of two coils each, one antenna coil (2), one detector coil (9). See coil winding directions below.)
 - 2—Hammarlund 6-prong isolantite sockets (2, 9).
 - 1—Hammarlund 5-prong isolantite socket (14).
 - 1—Hammarlund flexible coupling (between condensers (10) and (15)).
 - 1—Metallic coupling (between condensers (3) and (10)).
 - 3—Automatic Winding Co. intermediate frequency transformers, complete with I.F. coils, tuning condensers and shields; 115 kc. (23, 24), (33, 34), (45, 46).
 - 7—Automatic Winding Co. R.F. chokes (25, 31A, 35, 43, 47, 52, 64), 2.5 mh.
 - 1—Silver-Marshall 131P oscillator coil (14 A, B, C) or coil wound according to directions on Hammarlund isolantite short-wave coil form, type CF-5.
 - 2—Electrad 50,000-ohm potentiometers, type RI-205 (21, 69).
 - 3—Electrad Truvolt 400-ohm flexible resistors (7), (30), (41).
 - 1—Electrad Truvolt 1,000-ohm flexible resistor (38). Note: Used to control oscillation. Try smaller or large values as needed.
 - 1—Electrad Truvolt 1,500-ohm flexible resistor (62).
 - 1—Electrad Truvolt 2,000-ohm flexible resistor (17A).
 - 1—Electrad Truvolt wire-wound resistor, 300 ohms, type C-3, with clip moved to 250-ohm position (73). Note: A 250-ohm rheostat may be substituted, provided this will carry 300 mls. without undue heating.
 - 4—I.R.C. (Durham) 2-megohm metallized resistors, type M.F.4½ (27, 37, 50, 67).
 - 1—I.R.C. (Durham) 5-megohm metallized resistor, type M.F.4½ (12).
 - 2—I.R.C. (Durham) 20,000 ohm metallized resistors, type M.F.4 (22, 70).
 - 1—I.R.C. (Durham) 25,000-ohm metallized resistor, type M.F.4 (58).
 - 1—I.R.C. (Durham) 50,000-ohm metallized resistor, type M.F.4 (17).
 - 2—Aerovox .1-mf. (each section) double section metal case condensers, type 260-21 (6, 8), (18, 25A).
 - 2—Aerovox .1-mf. (each section) triple section metal case condensers, type 260-31 (29, 31, 32), (40, 42, 44).
 - 1—Aerovox .00015-mf. mica condenser, type 1460 (11).
 - 1—Aerovox .00025-mf. mica condenser, type 1460 (16).
 - 1—Aerovox .0005-mf. mica condenser, type 1460 (77).
 - 5—Aerovox .002-mf. mica condensers, type 1460 (26, 36, 48, 53 54).
 - 2—Aerovox .01-mf. mica condensers type 1450 (20, 63).
 - 2—Aerovox .25-mf. metal case condensers, type 260 (74, 75).
 - 1—Aerovox .5-mf. metal case condenser, type 260 (57).
 - 1—Aerovox 1-mf. metal case condenser, type 260 (68).
 - 1—Aerovox 4-mf. dry electrolytic condenser, type E5-4 (small can (61)).
 - 1—Aerovox 8-mf. dry electrolytic condenser, type E5-8 (78).
 - 1—Trutest 30-henry audio choke (77).
 - 1—Eby twin "speaker" jack (65, 66).
 - 7—5-prong wafer-type sockets (5, 13, 19, 28, 39, 49, 60).
 - 1—Drum dial with escutcheon plate and 3-ampere, pilot light (76).
 - 1—Antenna binding post or antenna flexible lead (1).
 - 5—Binding posts for control box.
 - 1—110-volt type single-throw, double-pole flush-plate toggle switch (72, 72A).
 - 1—Single-pole, single throw Cutler-Hammer toggle switch (71).
 - 4—Arcturus 136-A screen grid tubes (5, 13, 28, 39).
 - 2—Arcturus 137-A tubes (19), (49).
 - 1—Arcturus 138-A tube (60).
 - 1—3-volt flashlight battery (51).
 - 1—22½ volt "C" battery (56).
 - *1—Trutest audio transformer, ratio 3½ to 1, AF-8, type 2A325 (55).
 - *1—Trutest audio choke, 30-henry.
 - 1—Weston D.C. milliammeter (0 to 1 range), model 301, for visual tuning.
 - 1—Littelfuse fusible cap. No. 1037, with two ½-ampere, 500-volt instrument Littelfuses, type 1046 (79).
 - 1—Small Wright-De Coster No. 255 reproducer (66A), 6½ inches diameter (6-volt field for storage battery operation or 110-volt field if operated from line).
 - 1—Control box.
 - 1—Jones plug (9-prong) with corresponding socket.
 - 1—Bakelite panel 12¾ x 11¾ x 3/16 inches (See Fig. 7).
 - 3—Aluminum shields, same size as shields containing I.F. transformers, 2¼ inches high. Shield "X" contains (25, 26, 27). Shield "Y" contains (35, 36, 37). Shield "Z" contains (47, 48, 50).
- Note—Numbers in parentheses refer to corresponding numbers used to mark parts on diagrams.
- *Trutest parts manufactured by Wholesale Radio Service Co. of New York City.
- ### DATA ON COILS USED IN THE "ULTRA-SEVEN" SUPERHETERODYNE COILS (2) AND (9)
- Coil Forms: Hammarlund Isolantite, 1½ inches diameter, 2½ inches long exclusive of knobs and prongs. Six-prong forms used.
- 9 to 15 Meters:
Secondary, 2-5/6 turns of No. 16 enamel.
Primary, 1-5/6 turns of No. 34 enamel.
Tickler, 3 turns of No. 32 double silk.
- 14.5 to 25 Meters:
Secondary, 6¼ turns of No. 16 enamel.
Primary, 3-5/6 turns of No. 34 enamel.
Tickler, 3 turns of No. 32 double silk.
- 23 to 41 Meters (Coil Set No. 1):
Secondary, 11-5/6 turns of No. 18 enamel.
Primary, 7-5/6 turns of No. 34 enamel.
Tickler, 3 turns of No. 32 double silk.
- 40 to 70 Meters (Coil Set No. 2):
Secondary, 19-5/6 turns of No. 18 enamel.
Primary, 12-5/6 turns of No. 34 double silk.
Tickler, 4 turns of No. 32 double silk.
- 65 to 115 Meters:
Secondary, 34-5/6 turns of No. 24 enamel.
Primary, 21-5/6 turns of No. 34 double cotton.
Tickler, 4 turns of No. 32 double silk.
- 115 to 200 Meters (Coil Set No. 3):
Secondary, 62-5/6 turns of No. 28 enamel.
Primary, 38-5/6 turns of No. 32 double silk.
Tickler, 5 turns of No. 32 double silk.
- 200 to 360 Meters (Coil Set No. 4)
- Antenna Coil (2)
Secondary, 130-5/6 turns No. 32 double silk.
Primary, 60-5/6 turns No. 32 double silk.
Tickler, 7 turns No. 32 double silk.
- Detector Coil (9)
Secondary, 98-5/6 turns No. 32 double silk.
Primary, 47-5/6 turns No. 32 double silk.
Tickler, 7 turns No. 32 double silk.
- 350 to 550 Meters (Coil Set No. 5)
- Antenna Coil (2)
Secondary, 171-5/6 turns No. 32 enamel.
Primary, 82-5/6 turns No. 32 enamel.
Tickler, 9 turns No. 32 double silk.
- Detector Coil (9)
Secondary, 166-5/6 turns No. 32 enamel.
Primary, 82-5/6 turns No. 32 enamel.
Tickler, 9 turns No. 32 double silk.
- Note.—It may be necessary to add several turns to tickler winding of detector coil (9) to obtain desired regeneration.
- ### OSCILLATOR COIL (14 A, B, C)
- Coil Form: Hammarlund Isolantite, 1½ inches diameter, 2½ inches long. Five-prong form used.
- Grid Coil (14A):
82½ turns No. 28 enamel.
- Plate Coil (14B):
32-2/3 turns No. 28 double silk.
- Inner Coupling Coil (14C):
50 turns No. 28 double silk. (14C) is wound on cardboard form which just fits inside isolantite form.
- The intermediate frequency coils are "universal" wound with 800 turns of No. 36 S.S.C. wire each; tuned by Hammarlund adjustable condensers of 140-220 mmf. range. Each coil has an inductance of 6,900 microhenries or 6.9 millihenries. The I.F. coils are wound "universal" machine or "bank" style on a ½-inch diameter dowel. The I.F. is 115 kc.
- Short Wave Craft, Oct., 1932.



"Improved" 5 Meter Super-Regenerator

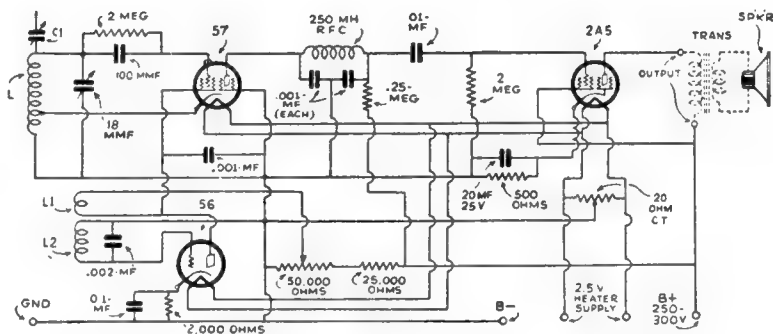
Parts List for 5 Meter Receiver

- 1—grid coil (see text).
- 1—18 mmf. tuning condenser. National.
- 1—interruption frequency coil. Gen-Win.
- 1—250 R.H. Rf choke. Gen-Win.
- 1—.0001 mf. mica condenser.
- 3—.001 mf. mica condenser.
- 1—.002 mica condenser.
- 1—.1 mf. Bypass condenser.
- 1—.01 mf. Bypass condenser.
- 1—20 mf. 25 volt electrolytic condenser.
- 2—2 meg. ½ watt resistor. Lynch.
- 1—2,000 ohm 1 watt resistor. Lynch.
- 1—250,000 ohm 1 watt resistor. Lynch.
- 1—25,000 ohm 1 watt resistor. Lynch.
- 1—500 ohm 1 watt resistor. Lynch.
- 1—50,000 ohm potentiometer. Acratist.
- 1—20 ohm C.T. resistor. R. T. Co.
- 1—6 prong isolantite socket, National (Hammarlund).
- 1—6 prong laminated socket. Na-ald.
- 1—5 prong laminated socket. Na-ald.
- 1—Type "B" 270 degree dial. National.
- 1—57 tube R.C.A. Radiotron Co. (Arco).
- 1—56 tube R.C.A. Radiotron Co. (Arco).
- 1—2A5 tube R.C.A. Radiotron Co. (Arco).

Cathode Tap

The cathode tap is taken off the grid coil three turns from the ground end. Oscillation can be obtained with the tap at the second turn but the screen voltage will have to be turned up too high and results in less sensitivity to weak signals and a very high hiss level.

One must also be careful not to have too



much capacity across the grid coil of the receiver; eight turns of No. 12 solid enameled antenna wire are used, having an inside diameter of one-half inch. This is tuned with an 18 mmf. National ultra frequency condenser, having plates cut to give a 270 degree tuning range. With this coil and condenser, the 5 meter band is spread over 60 degrees on the dial.

The Question of Interruption Frequency

In a circuit where we have increased sensitivity, it is possible to use a much higher interruption frequency and so obtain much better quality. Using a higher frequency does not reduce the audio volume level to any great extent, so far as can be determined by the ear; the improved quality alone would be worth a slight decrease in volume. To obtain a higher interruption

frequency it is necessary to remove about one-third of the turns from the transformer primary and secondary, assuming that the original has 800 turns in the primary and 1200 to 1400 for the secondary.

The writer has found that the sizes of the tuning condensers shunted across the interruption frequency coils has a decided effect on the receiver's ability to perform during duplex QSO's.

Antenna Coupling Critical

One of the most critical points of the 57 detector is the antenna coupling. Extremely loose coupling was found necessary and surprising as it may seem loose coupling does not reduce the sensitivity of the receiver. The best antenna system used was a vertical wire three half-waves in length, or 24 feet.

—Short Wave Craft, Feb., 1934.

5 Meter Super-Regenerator

Construction Data

The two detector coils are each wound with 5 turns of No. 10 gauge copper wire (B&S) and are made by winding the wire on one-half inch bakelite rod, letting it slide off and pulling it out so that there is a space about one diameter between turns.

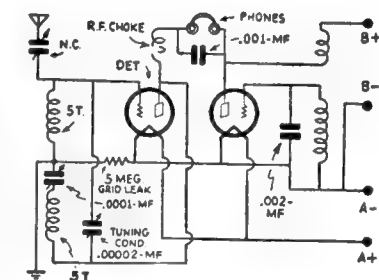
The adjustable condenser in series with the aerial should be a neutralizing condenser and should generally be worked at a very small capacity. (10 to 20 mmf.)

The "super" tube is simply a straight-forward oscillator. All it needs is coils! These were wound originally on a solid 1½ inch ebonite (bakelite) former with two deep slots turned in it. No. 32 or 34 (B&S) gauge wire was used and 1,000 turns were wound for the grid coil and 750 turns for reaction (plate coil). Here again the outside ends go to the grid and plate and the "middles" to L.T. negative (A minus) and

H.T. positive (B plus) respectively. The grid coil is shunted by a .002 mf. fixed condenser.

The operation is as follows: First of all, don't use more than 60 volts of H.T. (B battery). It isn't necessary. Remove the "super" tube altogether and make sure that the detector is oscillating. Then put in the "super" and listen for the characteristic mushy hissing noise which indicates that it is working. You only hear this, by the way, when the detector is oscillating and you should set the reaction condenser so that it is not oscillating too hard (although the setting is not at all critical).

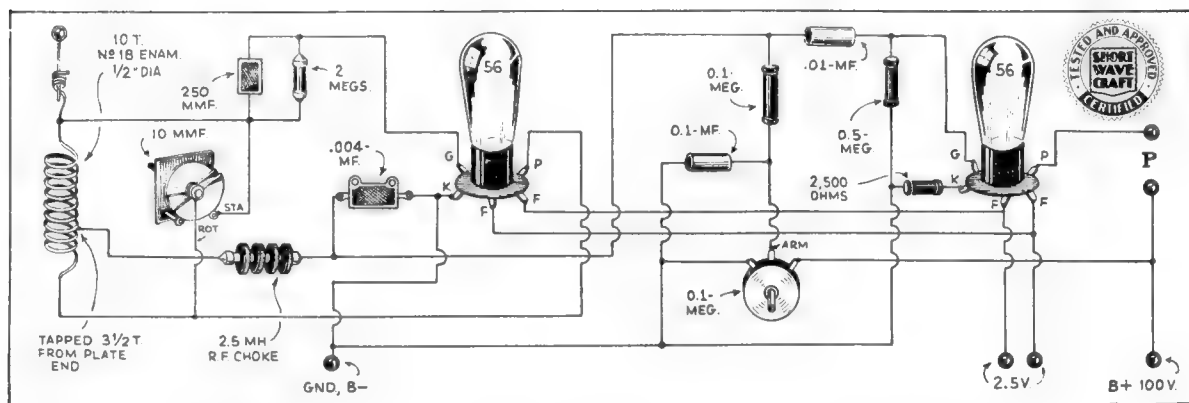
Don't worry about what will appear to be a loud background noise—as soon as you tune in a signal of any strength the noise disappears! A carrier wave without any modulation on it will appear as a hole in the mush. Tune around the band very



slowly, listening for any diminution in the mush. A really weak station will only cut it down slightly, but you should be able to hear speech and music through the noise that remains.

—Amateur Wireless, London.

5 Meter Bear-Cat Receiver



Parts List for 5-Meter Super-Regenerator

- 1—(approximately) 10 mmf. midget variable condenser.
- 1—.00025 mf. mica condenser.
- 1—.004 mf. mica condenser.

- 1—.1 mf. by-pass condenser.
- 1—.01 fixed condenser.
- 1—2 megohm grid leak.
- 1—.1 meg. fixed resistor.
- 1—.5 meg. fixed resistor.
- 1—25 ohm fixed resistor.
- 1—100,000 ohm potentiometer.

- 2—5-prong sockets.
- 1—Special inductance (homemade)—see diagram.
- 1—2½ millihenry R.F. choke.
- 2—Type 56 RCA Radiotron tubes.
- 1—6"x10"x7" chassis. Blan; Insuline.

—Short Wave Craft, Aug., 1934.

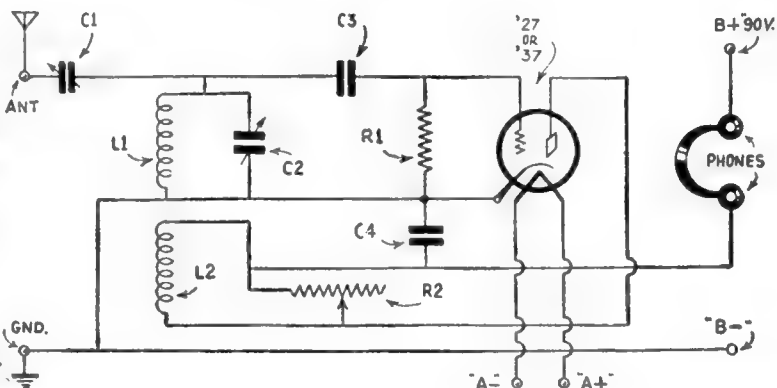
The Oscillodyne

Parts List for Building the Oscillodyne

- 1—Aluminum panel, 4½"x6"x1/16". Blan (Insuline Corp. of America.)
- 1—Bakelite subpanel, 4½"x5½"x3/32". Insuline Corp. of America.
- 1—50,000 ohm variable resistor, R2, Frost, (Clarostat).
- 1—Set of 4 pin plug-in coils wound on Hammarlund Isolantite forms 1½" dia., per specifications given in article.
- 1—Series antenna condenser, C1, about 25 mmf. max., Hammarlund Compensator type condenser.
- 1—Variable tuning condenser, C2, .0001 mf., Hammarlund.
- 1—Grid condenser, C3, 100 mmf., or 50 mmf. Illini (Polymet).
- 1—Fixed resistor, R1, 3 megohms, Lynch.
- 1—Fixed condenser, C4, .0005 mf., mica type, Pilot or Flechtheim. (Polymet).
- 7—Binding posts, Eby.
- 1—3" midget National Velvet Vernier Dial, type BM.

The plug-in coils employed are wound on tube bases. The specifications for the windings are given in the table accompanying this article. The turns of both windings are wound without spacing. It is essential that the two windings be wound in the same direction. This means that if the two inside terminals of the windings are connected together, the coil will appear like a continuous winding tapped near the center.

In regard to coil specifications, the following table is furnished for tube base



coils wound with No. 36 D.S.C. wire and tuned with a 100 mmf. (.0001 mf.) condenser. The first two coils may need a half turn adjustment one way or the other.

Approximate Wavelength (meters)	Sec.	Tickler
14-25	4	6
23-41	7	5
40-85	14	12
83-125	23	23
120-200	36	36

About ½" separation between windings. It will obviously be necessary to extend the

tube base forms if coils for the "broadcast band" are used. However, grid and plate windings of about 67 turns will tune from 200-360 meters and 105 turn windings will tune from 350-550 meters with the above condenser.

The windings should be so connected that the two outside leads go to the grid condenser and the plate of the tube, respectively, while the two inner leads go to the cathode and phones respectively. If connections are not made in this manner the tube will not oscillate!

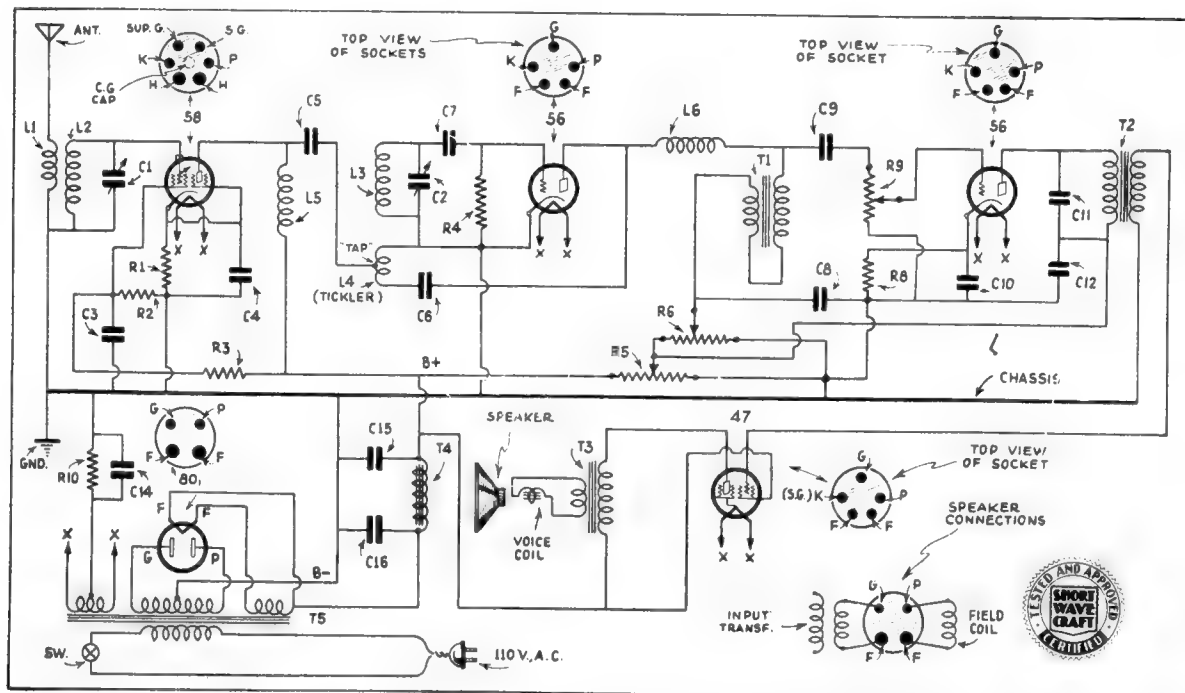
—Short Wave Craft, April, 1933.

The schematic diagram illustrates a vacuum tube radio receiver circuit. The power supply section on the right features a B+ 180V AC source connected to a series combination of resistors R5 and R4. A tap point is provided for a 2.5V AC filament supply. The main B+ line passes through a variable resistor R3 and a capacitor C6 before reaching the plate of the 53 vacuum tube. The 53 tube's grid is connected to a network of components including a variable resistor R1, a capacitor C3, and a resistor R2, which is in turn connected to a transformer T1. The transformer T1 has a primary winding connected to the B+ line and a secondary winding connected to a variable resistor R3 and a capacitor C6. The antenna input section on the left includes an antenna (ANT.) connected to a capacitor C1, which is then connected to a transformer L1. The secondary of L1 is connected to a network of components including a capacitor C2, a resistor R1, and a capacitor C3, which are connected to the grid of the 53 tube. The 53 tube's cathode is connected to ground (GND.). The output of the 53 tube is connected to a transformer T1, which is also connected to a variable resistor R3 and a capacitor C6. The secondary of T1 is connected to a speaker or headphones (PHONES).

—Short Wave Craft, Oct., 1938.

The tapped inductance coil is wound on a bakelite form 1" in diameter and 2" long. No. 35 D. S. C. wire is employed and there is no spacing between turns. The windings are separated by one-eighth of an inch. The winding procedure is as follows:

A 5-Tube A.C. Oscillodyne Set



Wdg. L1 Wdgs. L2 and L3 Wdg. L4

Coil No.	Turns No. 31 DSC	Turns No. 22 DSC	Lgth. in.	Pitch in.	T.P.I.	35 DSC	Tap at
1	4 1/4	4 1/4	1 1/2	6	6	6	3
2	6 1/4	10 1/4	1	12	8	4	4
3	7 1/4	22 1/4	1 1/8	40	12	6	6
4	15 1/4	51 1/4	1 1/8	40	20	10	

It will be noted that the rewind winding L4 is tapped at the center. In order to do this and at the same time employ a four-prong coil form it is necessary to solder the grounded lead of this winding into the prong occupied by the grounded terminal of L3. The tapped lead then occupies the prong vacated by this procedure, while the outside terminal retains its former position. As previously, the windings L3 and L4 should be wound in the same direction or the tube will not oscillate.

Parts List

- C1, C2—Cardwell Midway Double Section "C" Type Variable Condenser—140 mmf. per section. Type 405-c.
 C3, C4, C5, C6, C11—Aerovox Type 1460 Mica condenser .004 mf.
 C7—Aerovox Type 1460 Mica Condenser—.00015 mf.
 C8, C10, C12—Aerovox Type 281 Tubular Cartridge Condensers, .5 mf., 200 D.C. W.V.
 C9—Aerovox Type 281 Tubular Cartridge Condenser, .01 mf., 200 D.C. W.V.
 C14—Aerovox Type PR25 Dry Electrolytic Tubular Condenser, 25 mf., 25 V. D.C.
 C15, C16—Aerovox Type E5 Dry Electrolytic Filter Condenser, 8-8. mf., 450 D.C. W.V.

R1—Electrad Truvolt Wire Wound Pigtail Resistor, Type PG, 400 ohm.
 R2, R3—Aerovox Type 1094 Resistors, 50,000 ohm, 1 watt.
 R4—Aerovox Type 1095 Resistor, 1 meg-ohm, 1/2 watt.
 R5—Electrad Truvolt Adjustable Resistor, Type B 150, 15,000 ohm, 25 watts, with one extra slide.
 R6—Electrad Potentiometer, Type R1-279, 25,000 ohms.
 R8—Electrad Truvolt Wire Wound Pigtail Resistor, Type P6, 2000 ohm.
 R9—Electrad Potentiometer, Type R1-281P, 200,000 ohm, with A.C. Switch.
 R10—Electrad Truvolt Wire Wound Pigtail Resistor, Type PG, 500 ohm.

L1, L2, L3, L4—2 sets Alden Short Wave Coils, Type 704SWS. L4 rewind, see text for details.
 L5, L6—Hammarlund Isolantite R.F. chokes Type CH-8. (Inductance 8 M. H.)
 T1, T2—Thordarson Audio Frequency Transformers, Type T-5736.
 T3, T4—Jensen Dynamic Loud Speaker Type 3007A, 1800 ohm field.
 T5—Thordarson Pentran Power Transformer, Type T-4900.

2—Hammarlund 4 prong isolantite sockets, S-4.
 1—Alden* 4 prong laminated socket, 280 marking; 2—5 prong, 56 mark; 1—5 prong, 47 mark; 1—6 prong, 58 mark; 1—4 prong, plain; 1—4 prong connect-oral socket, type 94. *(Na-aid).

1—Eby Twin Binding Post Assembly.
 1—Special "Blan" chassis.

Five tubes—R.C.A., one-58, two-56, one 47, one-80 (Arcturus; Sylvania or R. C. A.).

By inserting a screen grid tube between the two tuned circuits it is possible by taking suitable precautions in regard to shielding to practically eliminate all feedback from the detector circuit into the input circuit. This enables a degree of selectivity to meet the demands of the average short-wave listener.

Complete shielding of the R.F. and detector stages is essential for two reasons.

The loud speaker used in connection with this set is a Jensen type 3007A having a built-in transformer designed to couple to a single type 47 output. The field of this speaker has a resistance of 1800 ohms and is used as the choke in the power-supply filter. Connections to the loudspeaker are with an Alden four-prong wafer socket mounted on the back of the subpanel. The proper method of making connections to this socket is shown in the diagram.

After the set has been completely wired it is necessary to make alterations to the Alden coils used in the detector circuit before the set can be put in operation. The ticker winding is removed and re-wound according to the specifications given in the appended table. The details of the other windings are also given for the benefit of those wishing to wind their own coils from blank forms.

The “Regenerative-Oscillodyne”

PARTS REQUIRED FOR REGEN.

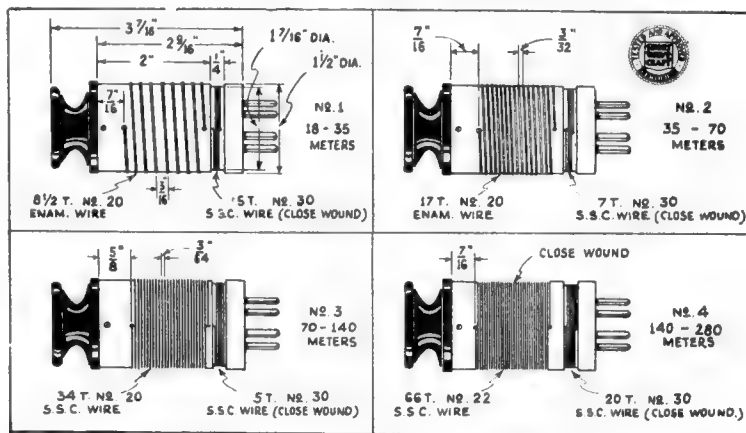
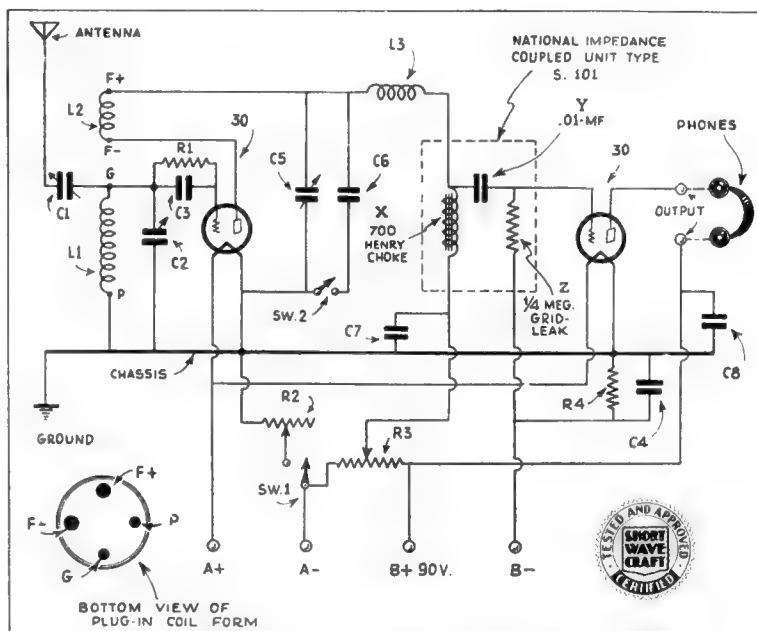
OSCILLODYNE SET

- C1, C5—Hammarlund Adjustable Padding Condenser, 10-70 mmf., type MICS-70.
- C2—Hammarlund Midline Midget Condenser, 140 mmf., type MC-140-M.
- C3—.0001 mf. Molded Mica Condenser, pigtail leads.
- C4—25 mf. Dry Electrolytic Condenser, with Mounting Strap. Type DR-275.
- C6—.005 mf. Molded Mica Condenser, type MC-1218 or NM-1283.
- C7, C8—.5 mf. Tubular By-Pass Paper Condensers, type BB-2050 (Concourse).
- L1, L2—5 Hammarlund 4-prong isolantite coil forms, type CF-4.
- 40 feet No. 22 enameled magnet wire.
- 35 feet No. 26 double-silk covered wire.
- 100 feet No. 34 double-silk covered wire
(See below for Winding Details.)
- L3—Hammarlund 8 mh. R.F. choke, type CH-8.
- T4—National Impedance Coupling Unit, type S-101.

- R1—Lynch 2 megohm Metallized resistor, ½ watt, type LF-4½.
- R3—50,000 ohm Volume Control (Potentiometer).
- R2—20-ohm Rheostat, or Amperite, type 1-1.
- R4—Wire-Wound Pigtail Resistor, 700-ohms.
- 2—Eby 4-prong isolantite sockets.
- 1—Eby 4-prong wafer socket.
- 1—Eby molded "Twin Binding Post Assembly.
- 1—Eby Molded Twin Speaker Jack Assembly.
- 1—National Type B Dial (0-100-0).
- 1—Midget Jack Switch, S.P.S.T.
- 1—Midget Jack Switch D.P.S.T.
- 1—Alden (Na-ald) 4-prong socket, type 424.
- 1—Alden (Na-ald) Connectorald Plug, type 94.

CIRCUIT DATA

The audio frequency amplifier is impedance-coupled, which makes it possible to match the rather high plate impedance of the 30 tube when employed in the oscillodyne connection. Of course, this condition could also have been met by resorting to resistance type coupling but



impedance-coupling will result in substantially greater volume and has other advantages as well. For this purpose, a National S-101 impedance-coupling unit is employed, which consists of a 700 henry

choke, together with a .01-mfd. coupling condenser and a 250,000-ohm grid-leak, all mounted in a single container.

—Short Wave Craft, July, 1933.

Coil Data

Wavelength		L1		L2	
Coil No.	range (Meters)	No. Turns	B.&S. Wire Ga.	No. Turns	B.&S. Wire Ga.
1	18-35	* 8.5	22 En.	5	34 D.S.C.
2	35-70	* 17.0	22 En.	7	34 D.S.C.
3	70-140	* 34.0	22 En.	12	34 D.S.C.
4	140-280	66.0	26 D.S.C.	20	34 D.S.C.
5	280-560	130.0	34 D.S.C.	20	34 D.S.C.

*Turns spaced to make length of winding equal to 1½ inch.

The Short-Wave Superregenode

List of Parts

Two Hammarlund "MLW-125" 125 mmf. Short Wave condensers, C1, C2, and two Kurz-Kasch vernier dials;
 One Hammarlund 14-to-110 meter "Model LWT-4" short-wave kit, L1;
 One Hammarlund 14-to-110 meter "Model LWC1" short-wave kit, L2;
 One Hammarlund "Type RFC 250" 250-mh. R.F. choke, RFC1;
 One Hammarlund "Type EC 80" 80 mmf. equalizing condenser, C4;
 One Flechtheim filter block (five 1-mf. units), C6, C7 (2 mf.), C8 (1 mf.);
 One Ferranti "Type AF-5," 3.75-to-1 ratio audio transformer, T;
 Two Sangamo .001-mf. fixed condensers, C3, C5;
 Two Electrad 50,000-ohm "Super-Tonators," R1, R2;
 One Acme 30-kc. I.F. transformer, L3 (see text);
 One Yaxley 7-wire cable, 3 to 9;
 Two Eby lettered binding posts, 1 and 2;
 One output connection block, 10-11;
 Two Pilot 4-prong UX sockets, V1, V2;
 One Pilot 5-prong UY socket, V3;
 One aluminum cabinet 7 x 9 x 18 x 3/32" thick;
 Two aluminum sheets (partitions), 7 7/8 x 9 7/8 x 3/32" thick;
 Miscellaneous hardware (screws, nuts, lock-washers, wire, etc.).

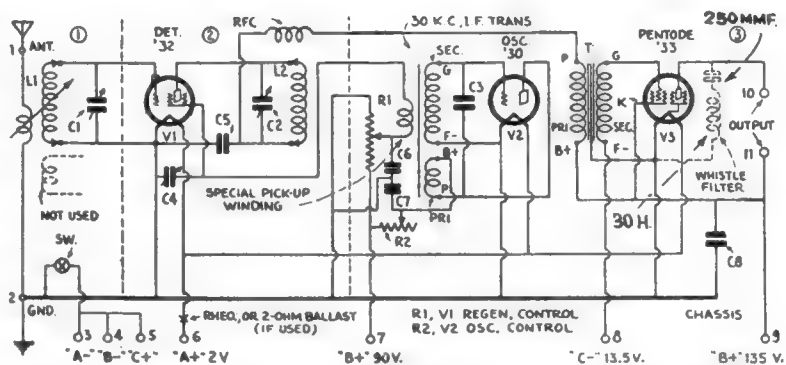
The kit of coils designated as LWC1 consists of single windings with the same number of turns as the secondary in the Type LWT4 kit. Data on the latter are as follows:

Meter Range	Sec. Turns
14-24	3
22-40	7
36-65	15
60-110	24

(Continued from previous page)

A winding, S4, must be placed on the core of S3. This consists of 120 turns of No. 28 silk covered wire. Loosen the two top machine screws holding the core in place and slide the L shaped section out of the frame. Random-wind 60 turns of wire and then leave a 6 inch long loop. This loop will serve as the center tap connection of the oscillator pick-up winding. Then continue with the additional 60 turns, which will give the required number of turns.

—Short Wave Craft, Jan., 1933.



The first two coils are wound with No. 16 D.S.C. wire, 11 turns to the inch; the last two coils, No. 18 D.S.C., 17 turns to the inch; all on forms two inches in diameter. The adjustable antenna primary has 6 turns of No. 28 D.S.C. wire on a two-inch tube.

Some explanation is necessary, of the extremely novel, effective and compact oscillator inductance design which has been selected as the best.

An old Acme 30-kc. superheterodyne I.F. transformer (appropriately enough) had its outer protective metal covering removed; and over the outside of the exposed winding (the original primary-secondary combination) was wound a third or tertiary pick-up coil L of 160 turns of No. 28 enamelled wire, random wound. Condenser C3, .001-mf., tunes the oscillator circuit.

This happy artifice worked right off the bat, and oscillated to beat the band; functioning exactly right for the particular receiver shown in the diagram.

Operation of the Set

Insert in their respective receptacles the requisite two coils for a given tuning range

and turn the receiver's control switch to the "on" position. If the receiver is working, a thin high-pitched whistle will be heard in the background.

If this whistle is not evident, it is an indication that the oscillator is not functioning; and the first step is to reverse the leads to either the primary or secondary winding of the 30-kc. transformer (or the honeycomb coils, if used). This should correct the condition.

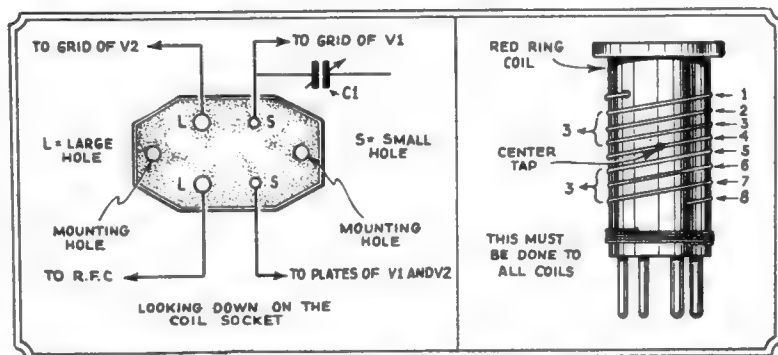
Vary the resistor R2; the volume of the whistle should change. Rotate the tuning control until a signal is heard; and for 'phone reception, vary the voltage on the screen-grid of V1 until the circuit is just under the point of "plop-over". For C. W. signals, let it "plop." Simple?

Every short-wave receiver must be nursed along until the operator becomes conversant with its eccentricities.

When searching for 'phone signals tune by the chirps and then lower the screen voltage by means of the potentiometer R1.

—Short Wave Craft, Oct., 1931.

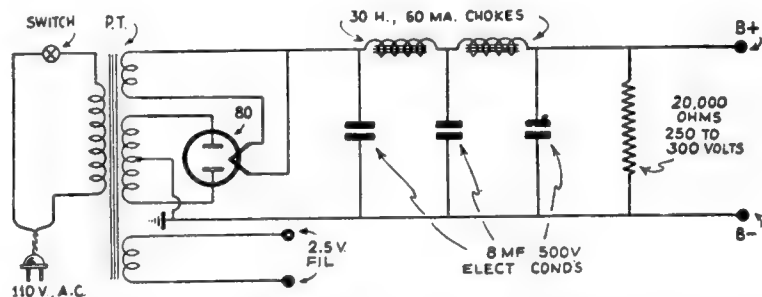
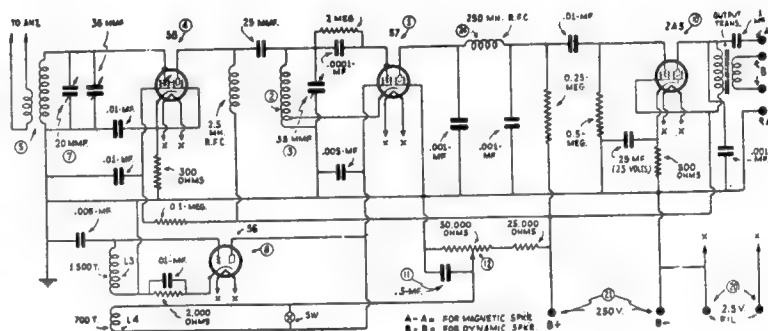
A Balanced Detector Super-Regenerator



A 4-Tube "5 and 10" Meter Receiver With Optional Super-Regenerator

Parts List of Receiver

- 1—Pentode output transformer. Acratest.
- 1—Chassis.
- 6—4 prong coil forms; ultra-high frequency type; National.
- 2—4 prong isolantite sockets; National (Hammarlund).
- 2—6 prong isolantite sockets; National (Hammarlund).
- 1—6 prong wafer socket (laminated); Eby (Na-ald).
- 1—5 prong wafer socket (laminated); Eby (Na-ald).
- 2—35 mmf. variable tuning condensers; Hammarlund.
- 1—20 mmf. variable tuning condensers; Hammarlund.
- 1—Vernier dial; National, type B.
- 1—2.5 millihenry choke; National.
- 1—250 millihenry choke (universal wound).
- 1—50,000 ohm potentiometer; Acratest.
- 1—"Interruption Frequency" transformer, 700 turns pri. 1500 sec; Gross Radio.
- 3—.001 mf. mica fixed condensers. Flecht-heim.
- 2—.005 mf. mica fixed condensers.
- 2—.00005 mf. mica fixed condensers (connected in series).
- 1—.0001 mf. mica fixed condenser.
- 1—.5 mf. bypass condenser.
- 4—.01 mf. bypass condensers (tubular).
- 1—25 mf. 25 volt electrolytic condenser; Acratest.
- 1—300 ohm 1 watt resistor, Lynch (International). Also following resistors.
- 1—500 ohm 1 watt resistor.
- 1—2,000 ohm 1 watt resistor.
- 1—25,000 ohm 1 watt resistor.
- 1—100,000 ohm 1 watt resistor.
- 1—250,000 ohm 1 watt resistor.
- 1—.5 megohm 1 watt resistor.
- 1—2 megohm 1 watt resistor.



Parts for "Power Supply"

- 1—Power transformer 325-0-325 plate, 2.5 fil, 5 v. R.T. Co.
- 2—30 henry, 60 milliampere chokes; Acratest.

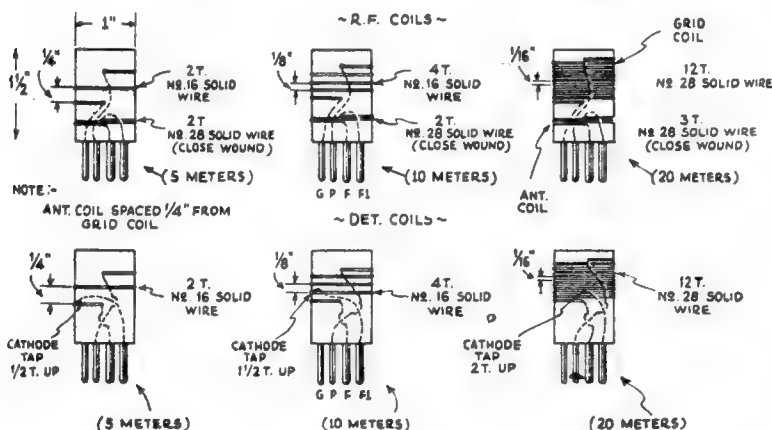
- 3—8 mf. 500 V. electrolytic filter condensers; Acratest.
- 1—20,000 ohm bleeder resistor (20 watts rating).
- 1—4-prong wafer socket, Eby (Na-ald).

An extra tube was added to the receiver to obtain super-regeneration, although this was not entirely necessary as very fine phone reception is obtained without it. The primary function of this addition is to enhance the reception of the very weak or broad modulated signals, such as those from new police broadcasting systems now operating on about eight and one half meters. These signals are so broad during modulation that it is impossible to receive them on a straight regeneration detector. However, when using super-regeneration the signal sounds first rate.

A type 56 is used as the generator of the interruption frequency oscillations, which produce the super-regenerative effect. The plate of the 56 is directly coupled to the screen-grid of the detector tube, the screen voltage to the detector tube and the plate voltage to the low-frequency oscillator being fed through L4 and controlled by the 50,000 ohm potentiometer.

The voltage to both tubes is adjusted at the same time, providing very smooth operation.

— Short Wave Craft, Nov., 1933.



3 in 1 Monotube Super-Regenerator

Parts List for Both One Tube Super-Regenerators

One—Hammarlund Midget Condenser. Type MC250M. 250 mmf. (14).

One—Hammarlund Midget Condenser. Type MCD-140; 140 mmf. (5, 6).

One—Flechtheim By-pass Condenser. Type GB-100. 1 mf., 200 volts. (12).

Two—Flechtheim Tubular Condensers. Type AZ-10. .002 mf, 1000 volts. (9, 10).

Two—Sets Alden Mfg. Co. Short Wave Coils. 15 to 200 meters.

Eight—Fahnstock Clips, (1, 2, 15, 16, 17, 18, 19, 20).

Two—Eby Chassis type sockets (3, 4) Four prong for the plug-in coils.

One—Eby Socket, type depends on the choice of tube used for reception. (11).

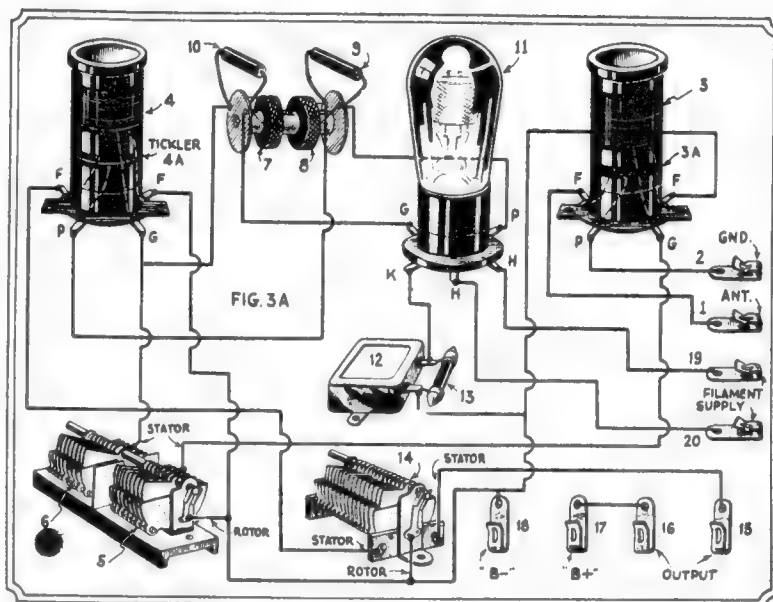
Two—Blan Special choke windings. (7, 8).

One—International Resistor 10,000 ohms, 1 watt (13).

One—Hammarlund Equalizer Condenser. Type EC-80, 25 to 80 mmf. (21).

(Optional method of antenna coupling.)

One—Blan 6 inch by 10 inch aluminum panel.



One—Wooden base-board 8x10x $\frac{1}{2}$ inches. All small brackets and incidental hardware can be purchased from Blan the Radio Man.

One Tube Super-Regenerator

Type of Tube	Plate Voltage	Voltage of Grid Bias	Value of Resistor 13 in Ohms
01A	135V	-13.5V*	-----
210	350V	-35.0V*	-----
112A	180V	-20.0V*	-----
22**	135V	-13.5V*	-----
24**	250V	-9V	5,000
27	250V	-30V	15,000
30	180V	-20V*	-----
32**	180V	-6.75V*	-----
36**	180V	-6V	5,000
37	180V	-20V	15,000
56	250V	-20V	15,000
57**	250V	-10V	5,000

*Bias furnished by "C" battery.

**Requires very large coupling impedance

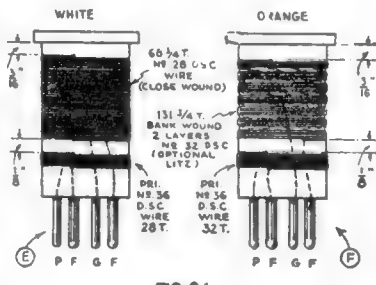
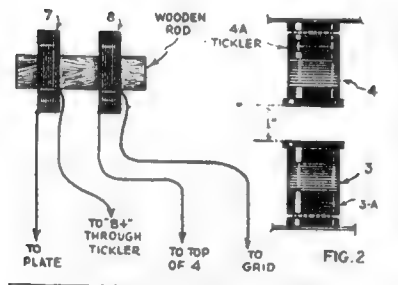
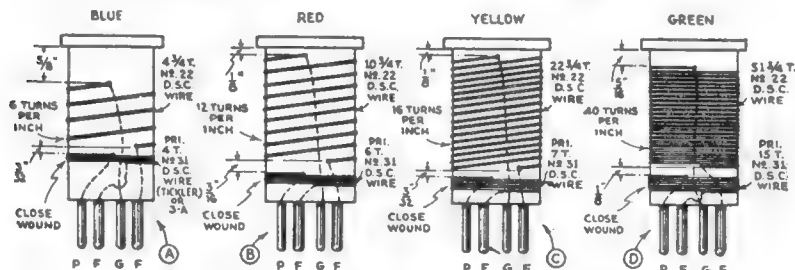


FIG. 2A



NOTE: ALL COIL FORMS 1 $\frac{1}{4}$ " DIAMETER BY 2 $\frac{1}{8}$ " LONG (OVERALL) $\frac{1}{8}$ " SHOULDER.

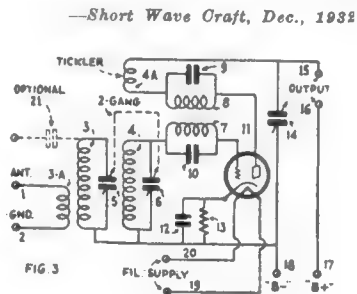
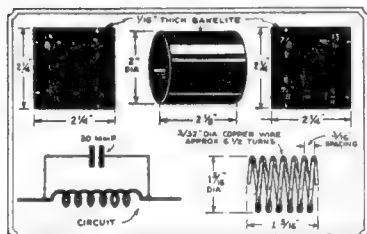


FIG. 3

A. C. Model.

—Short Wave Craft, Dec., 1932

The "Bear-Cat-3" 5-Meter Super-Regenerative Receiver



Above—Details of antenna resonance coil and condenser.

COIL DATA

The specifications for coils 4 and 5 are given below:

	No. of turns	Wire size	Spacing
Coil 4	7	14	1/16 inch
Coil 5	7	14	1/16 inch

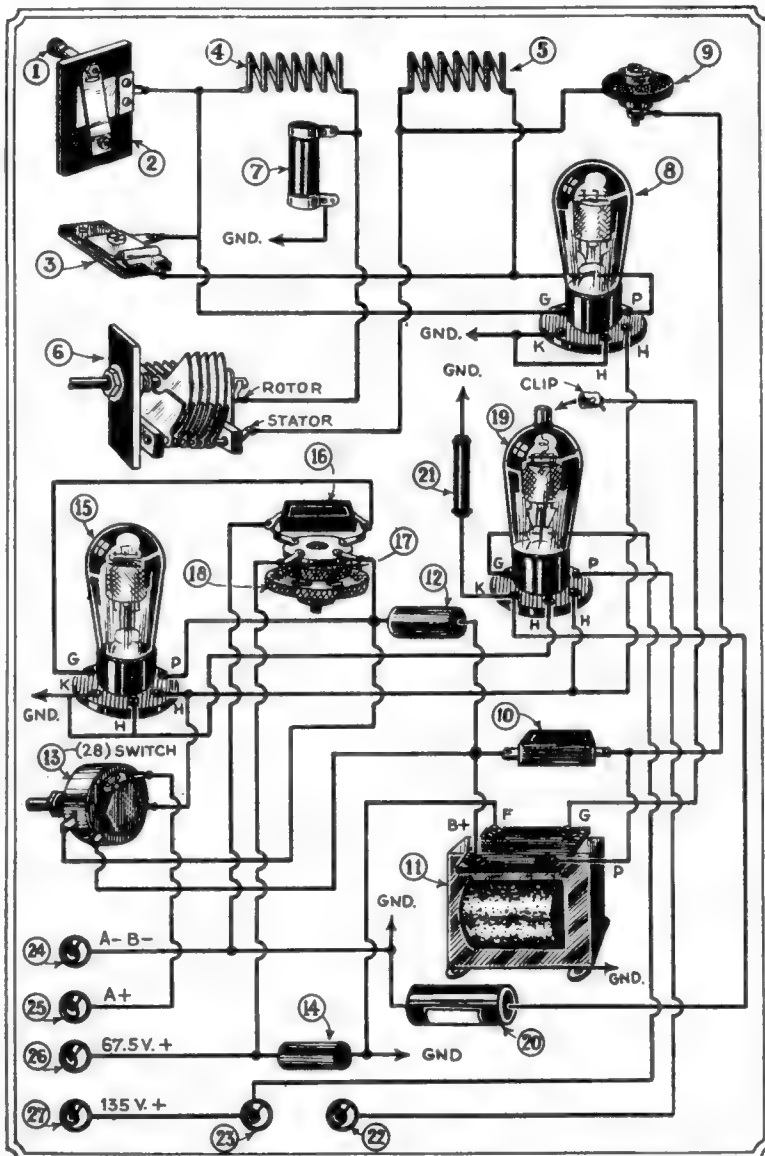
Coil 17.—Coil 17 consists of 650 turns No. 36 double silk covered wire, wound on a small bobbin 1/2 inch in diameter and closely coupled to the coil 18.

Coil 18.—The grid coil is number 18 and consists of 1,000 turns of the same size wire used on 17. This is wound in the same direction on the same bobbin and due to its small size can be bolted into place under the chassis.

Radio Frequency Choke No. 9.—This is a small choke and care should be used in building it. As the frequency range to which the receiver responds is very high, it is necessary that the distributed capacity of the winding be kept at a minimum. A satisfactory choke can be made by "jumble-winding" 80 turns of No. 36 double silk covered wire on a bobbin 1/2 inch in diameter.

Parts List

- 1—Antenna Binding Post (1).
- 2—Hammarlund equalizing cond. 35 mmf. (2, 3).
- 1—Hammarlund midget condenser (6).
- 1—International Resistance Co., 1-watt, 2-meg. resistor (7).
- 1—Panel mount socket, 5-prong (8).
- 1—Radio frequency choke (9). See above for specifications.
- 1—Aerovox mica condenser, .001-mf. (10).
- 1—Medium ratio audio transformer (11).
- 1—Flechtheim by-pass condenser, .1-mf (12).
- 1—Electrad 50,000-ohm potentiometer (13) with filament switch (28).
- 1—Flechtheim by-pass condenser, .1-mf. (14).



- 2—Wafer sockets, 5-prong (15, 19).
- 1—Mica condenser, .001-mf. (16).
- 1—By-pass condenser, .1-mf. or larger (20).
- 1—1,500-ohm resistor, 2 watts (21).
- 2—Output terminals (22, 23).
- 4—Binding posts (24, 25, 26, 27).
- 1—metal chassis and front panel.
- 1—Tuning dial.

- 1—Screen-grid clip. Wire, etc.

Note—Coils 4, 5, 17 and 18 winding data included in text above.

- 2—Eveready-Raytheon 37 tubes.
- 1—Eveready-Raytheon 38 tube.

Auto Tube Receiver

Parts List

One—Hammarlund Type ML 5 shortwave condenser (C1).
 One—Hammarlund Type ML 11 shortwave condenser (C2).
 One—Hammarlund Equalizer condenser, 32 mmf. (C3).
 Two—Sprague or Aerovox tubular bypass condensers, 0.1 mf. capacity (C4, C5).
 Two—Sprague or Aerovox tubular bypass condensers, 0.5 mf. capacity (C6, C9).
 One—Aerovox moulded mica condenser mid-gate type, .00015-mf. (C7).
 One—Aerovox moulded mica condenser, .02-mf. capacity (C8).
 Two—Lynch metallized resistors with pig-tails, 1 watt, 100,000 ohms (R1, R4).
 One—Lynch metallized resistor with pig-tails, 1 megohm, 1 watt (R5).
 One—Lynch metallized resistor with pig-tails, 6 megohm, 1 watt (R3).
 One—Lynch metallized resistor with pig-tails, 1500 ohms, 2 watt (R6).
 One—Electrad 500-ohm pigtail grid-suppressor resistor (R2).
 One—Electrad 0-50000 ohm bakelite shell Supertonatrol (R7).
 One—Bryant Electric switch, power type, single pole single throw two position (obtainable from Blan the Radio Man, N. Y. C.).
 One—Eby wafer socket, type 236 (V1).
 One—Eby wafer socket, type 237 (V2).
 One—Eby wafer socket, type 238 (V3).
 One—Pilot moulded bakelite socket, type 216 (V4).

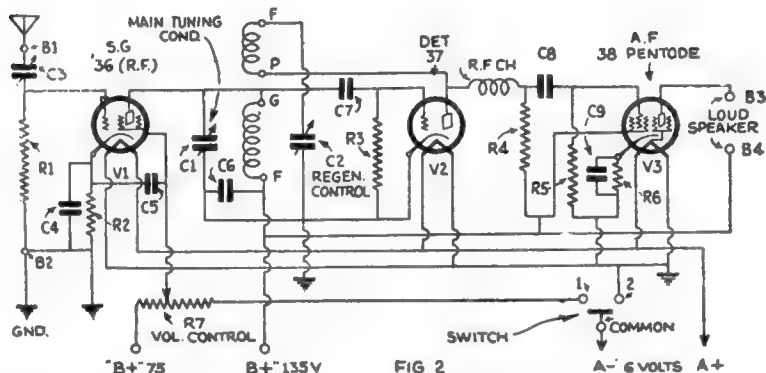


FIG 2

One—Pilot 80-millihenry R.F. choke.
 Four—Pilot binding posts (B1, B2, B3, B4).
 Two—Sheets aluminum $4\frac{1}{4}$ inches long by $3\frac{3}{4}$ inches wide by $\frac{3}{64}$ inches.
 Two—Sheets aluminum $8\frac{1}{4}$ inches long by $5\frac{1}{4}$ inches wide by $\frac{3}{64}$ inches.
 Two—Sheets aluminum $5\frac{1}{4}$ inches long by 4 inches wide by $\frac{3}{64}$ inches thick.
 Four—Aluminum Corp. of America aluminum corner posts $5\frac{1}{4}$ inches long tapped for 6/32 screws.

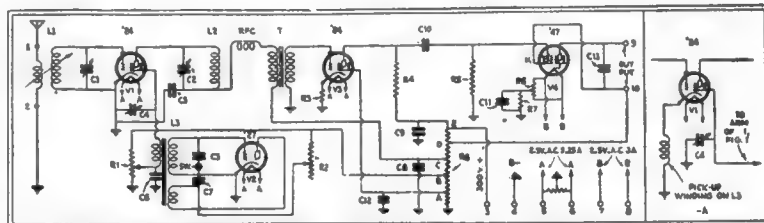
Three—Hammarlund screen-grid tube shields (V1, V2, V3).
 One—Coil shield can 3 inches diameter by 4 inches high.
 One—Bakelite or hard-rubber panel $1\frac{1}{4}$ inches by 2 inches by $\frac{3}{16}$ inches.
 Two—National type C vernier dials (C1, C2).
 One 236—One 237—One 238 automobile tubes. (Arcturus used in tests.)

—Short Wave Craft, Dec., 1931.

The A.C. Superregenode

List of Parts Used

Two Hammarlund "MI-W-125" 125-mm short-wave condensers, C1-C2, and two Kurz-Kasch vernier dials.
 One Hammarlund 14-to-110 meter "Model LW-T-4 short-wave coil kit, L1.
 One Hammarlund 14-110 meter model LWI-4 coil kit, L2.
 One Hammarlund "Type RFC 250" 250-mh. R.F. Choke, RFC1.
 One Hammarlund "Type EC 80" 80 mmf. equalizing condenser, C4.
 One Flechtheim filter block (five 1-mf. units), C6-C7-C8-C9-C12.
 One Ferranti "Type AF-5," 3.75-to-1 ratio audio transformer, T.
 One Sangamo .002-mf. double fixed condenser unit, C5-C13.
 One Aerovox .001-mf. fixed condenser, C3.
 One Sangamo .006-mf. fixed condenser, C10.
 One Aerovox 25-mf., 25-volt dry electrolytic condenser, C11.
 Two Electrad 50,000-ohm "Super-Tonats," R1-R2.
 Two Electrad 20-ohm V-type resistors, R6-R9.
 One Electrad 500 ohm wire-wound grid resistor, R3.
 Two Durham $\frac{1}{2}$ meg. 7-watt resistors, R4-R5.
 One Electrad 400-ohm wire-wound grid resistor, R7.
 One Electrad "R 71" 13,000-ohm voltage dividers, R8.
 One Carter battery switch.
 One Acme 30 kc. I. F. transformer or equivalent, L3.



Four Pilot UY (5-prong) sockets, V1-V2-V3-V4.
 One Yaxley 7-wire cable, 3-4-5-6-7-8.
 Two Eby lettered binding posts, 1 and 2.
 One output connection block, 9-10.
 One aluminum cabinet 7x9x18x $\frac{3}{32}$ thick.
 Miscellaneous hardware (two National screen-grid clips; screws, nuts, lock-washers, wire, etc.).

Any standard '45-type power pack may be used, as long as it delivers about 65 ma. at 300 volts or more; in the latter instance, it may be necessary to connect in series with the "B+" lead of the eliminator a heavy-duty variable resistor, such as the compression-type Clarostat, with a range of zero to one megohm to reduce the voltage to the correct value to match the characteristics of the voltage divider in the receiver chassis.

The type '47 pentode operates best at a plate potential of 250 volts and a control-grid bias of 16.5 volts. In the A.C. Superregenode, this plate or "B" potential is obtained directly from the current-supply system; while from the total output of this system must be subtracted the required "C" bias (obtained by means of bias resistor R7 and, for V3, R3).

The voltage divider in the receiver proper must be adjusted carefully to obtain maximum efficiency. The voltage readings at the taps should be about as follows: A, 18; B, 90; C, 180; D, 250; and E, 350 volts. A slight readjustment of A may be needed to obtain maximum A.F. amplification; this is the most critical operating value in the receiver.

—Short Wave Craft, Dec., 1931.

A Symmetrical Input Super Regenerator

VI, V2, V3—237 type tubes. R. C. A. (Arco).

V4—238 type tubes. R. C. A. (Arco).
R1, R2—50,000 ohms, resistor. All Lynch.
R3—500,000 ohms, resistor.
R4—1,000 ohms, resistor.
R5—2,500 ohms, resistor.
R6—50,000 ohms, resistor.
C1—100 mmf. Hammarlund Midget variable. (National).

C2—.002 mf. condenser.
C3—.5 mf. condenser. All Flechtheim.
C4—.5 mf. condenser.
C5—50 mf. condenser (electrolytic).

L1, L2, L3, L4 and L7 are wound on $\frac{3}{4}$ inch victron or other tubing with numbers of turns to suit the frequency desired. Care must be taken to make the input circuit symmetrical. With the number of turns on each coil as shown below the frequency range of the receiver was from 54 to 61 megacycles.

L1—3 turns.
L2—3 turns.
L3—7 turns.
L4—7 turns.
L7—4 turns.

By changing the turns of various coils, frequencies from 40 to 185 megacycles have been covered with this receiver.

L5 and L6—Made by separating the winding of a No. 125, 250 mh, Samson choke into two separate coils with a ratio of 1 to 3. The coil L5 has roughly three times the numbers of turns as coil L6. The variation frequency is approximately 100 kcs.

The approximate number of turns for L5 is 1,200 and for L6, 500; in most cases it is necessary to tune each of these coils

with a .001 or .002 mf. fixed condenser. More specifically the constructor may use a wooden form made from a piece of $1\frac{1}{4}$ inch diameter wood or bakelite rod. Two $\frac{1}{4}$ inch wide by $\frac{1}{2}$ inch deep grooves are cut in a piece of this rod, the grooves being $\frac{1}{2}$ inch apart. In one groove wind 1,200 turns of No. 36 S. S. C. wire "scramble" wound (helter skelter fashion, i. e., not in even layers). In the second groove 500 turns of No. 36 S. S. C. wire are wound.

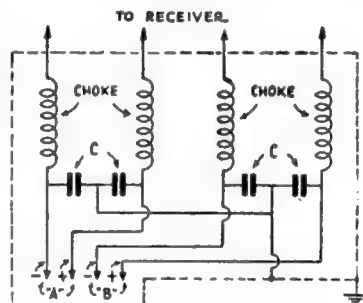
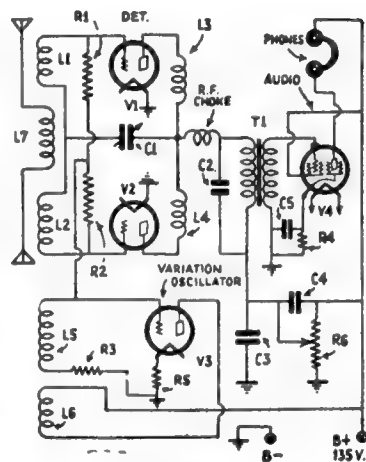
The choke consists of 45 turns of No. 40 D. S. C. copper wire on a slotted form with three slots. The overall length of the form is about $\frac{3}{4}$ inch.

R. F. Filter Used in Battery Leads

There are four entering leads and in each of these a radio-frequency choke was inserted, consisting of 20 turns of No. 18 enameled wire, wound on a threaded victron (or other) form $\frac{1}{2}$ inch in diameter. The thread pitch was 16 to the inch. In addition the chokes were each by-passed to ground with .005 mf. condensers. All four chokes and all four condensers were placed in a separate shielded compartment and the battery leads were shielded back to the batteries.

This filter helps to eliminate battery lead pick-up and constitutes a considerable improvement.

—Short Wave Craft, June 1933.



A 2-Volt 3-Tube "Ham" Set

Coil Table for Receiver

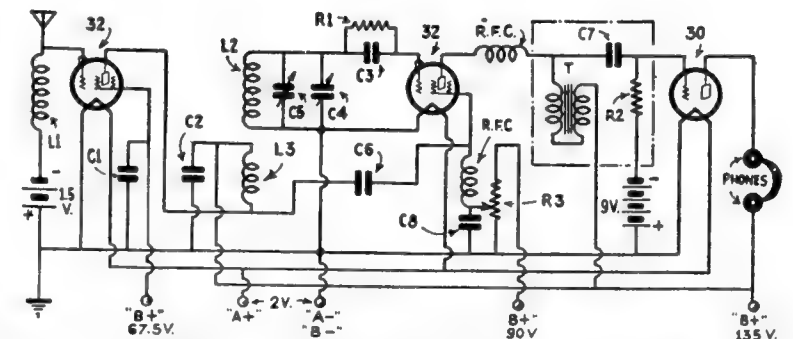
Grid coil	Wire	Primary-tickler coil L-3	Wire	Spacing
Met. L-2	5 No. 30 DSC	4 No. 30 DSC	$\frac{3}{16}$ "	
20	12 No. 26 DCC	11 No. 30 DSC	$\frac{9}{16}$ "	
40	28 No. 30 DCC	21 No. 30 Enamel	$\frac{9}{16}$ "	

Values

C1—.006 mf.
C2—.006 mf.
C3—.0001 mf.
C7—.005 mf.
C6—.00004 mf.
C8—1 mf.
R1—2 megohm.
R2—2 megohm.
R3—50,000 ohm Potentiometer.
T—Pilot Audio Transformer.
R.F.C.—Pilot Short Wave Choke
C4—.0001 mf. Pilot Midget.
C5—.0001 Pilot midget, cut down to four plates.

For antenna coil L1 for use on the 80 meter band wind a special coil containing 55 turns of wire.

All coils are close-wound except the twenty meter one, on which the spacing must



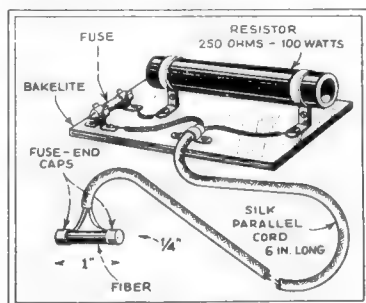
be found by experiment. The forty meter primary-tickler coil spacing should also be varied some in order to find the best value.

It should be noted that the coil L3 in this receiver is a combination tickler coil

for the detector and a primary coil which is connected in the plate circuit of the R.F. amplifier tube. This coil thus serves a double purpose.

—Short Wave Craft, May, 1933.

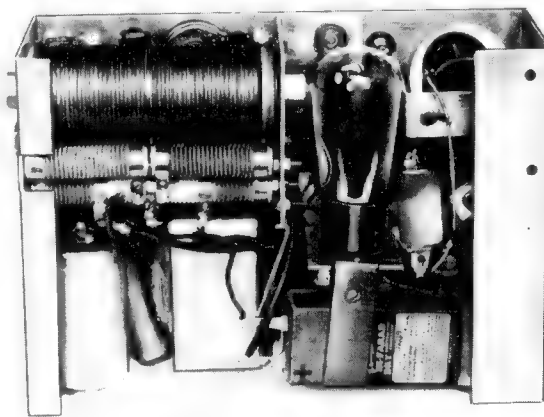
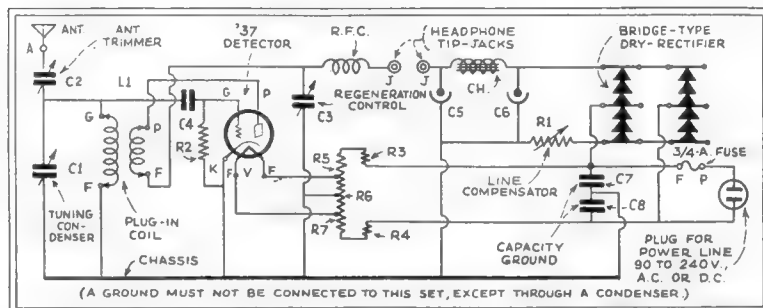
The Overseas 1-Tube 110-220 Volt A.C.-D.C. Receiver



Adapter for using the "portable" on 220 volts. When the fiber adapter is snapped into the fuse terminals, the 250 ohm resistor is in series with the circuit.

List of Parts

- One Gen-Win, type WH litz-wound "all-wave" coil kit (for 140 mmf. tuning condenser), L1.
- One Sun type WH short-wave choke, RFC.
- One Hammarlund type MC-140M, 140 mmf. midjet condenser, (C1).
- One Hammarlund type MC-100 M, 100 mmf. midjet condenser, C2.
- One Hammarlund type EC-80, 20 to 80 mmf. mica equalizer condenser, C3.
- One Aerovox type D1018 Hi-Farad 8 mf. dry-electrolytic condenser, C5.
- One Aerovox type E5-TD Hi-Farad 4 mf. dry-electrolytic condenser, C6.
- Two Aerovox type 381-T5, 0.1-mf. non-inductive paper condensers, C7, C8.
- One Ratco Polymet type NM-1271, 150 mmf. mica condenser, C4.
- One National, type BM-D vernier dial.
- One Clarostat type CLD volume-control resistor, R1.
- One Lynch type LF-4½, 6 meg., ½-watt resistor, R2.
- Two Electrad type B-1, 100 ohm, 25 watt resistors, R3, R4.
- One Electrad type C-2, 200 ohm, 50 watt resistor, (with three extra clips); R5-R6-R7.
- One Kenyon type KC-350, 30 hy. filter choke, Ch.
- One twin tip-jack, panel-insulated, J.
- One Eby binding post marked ANT., (with bakelite or hard rubber washers and bushing—not fiber or spaghetti), A.
- Two Blau type KK black knobs (one for ¼-in. shaft of C3 and one for 3/16-in. shaft of R1).
- Two RCA-Radiola dynamic reproducer dry-rectifier stacks, Radiola part No. 5898, (Sun Radio Co.), R.
- One Littelfuse ¼-A. fuse, F.
- Two Ratco fuse clips.
- One Ratco UY-type socket for V.
- One Ratco UX-type socket for L1.
- One pair Ratco type Erpees, No. 1693 featherweight headphones.
- One Ratco carrying case, 4¼x6½x11" long.
- One Ratco line-plug, P.
- One Ratco twin-conductor, No. 18 lamp-cord cable, 6 ft. long, (with male and female plugs).



Side view of the universal A.C. or D.C. portable 1-tube receiver for short or broadcast wave reception, showing the "dry-disc" rectifier clearly at the left.

- One Sylvania type '37 tube (with solid plate), V.
- One bakelite sub-panel (for fuse clips and plug P), 2½x2x1/16" thick.
- One Blau sheet-aluminum chassis, 16¼x6¼x1/16" thick.
- One aluminum strip (for bracket of V), 3¼x1½x1/16" thick.
- One aluminum strip (for bracket of L), 5¼x3¼x1/16" thick.
- One aluminum strip (for bracket of rectifiers), 2¼x4¼x1/16" thick.

It should be noted that the filament of the tube must be electrically grounded.

As we are not permitted to directly ground the filament (and only in rare instances, where the power line is not supplied with its own ground, through a condenser), since it connects directly to the light-line, we are forced to resort to a subterfuge—the capacitive ground; the center-tap of condensers C7, C8 affords this connection to the chassis. At the same time, these condensers act as filters to prevent light-socket key-clicks, refrigerator

and furnace thermostat noises, etc., being fed into the set, to make a "hash" of our signals.

Resistors R3, R4, R5, R7 must pass the current required by the combined value of the filament of V and resistor R6 in shunt. Without center-tapped resistor R6 (actually a portion of one resistor composed of R5, R6, R7), a very fine grade of "hum" will be heard (when the set is A.C. operated); with it, a graveyard is bedlam compared to the between station silence when the contact clips are correctly set (as a matter of fact, only static or "strays" will indicate that the set is working, when the tuning dial is set off-tune.)

A good design of filter choke and 12 mf. of capacity in the plate-supply filter system furnish adequate filtration of the output of the full-wave rectifier, despite the fact that the efficiency of the dry-disc rectifier is relatively low. Putting R1 in the negative leg of the plate supply slightly increases the efficiency of the filter system.

—Short Wave Craft, Jan., 1933.

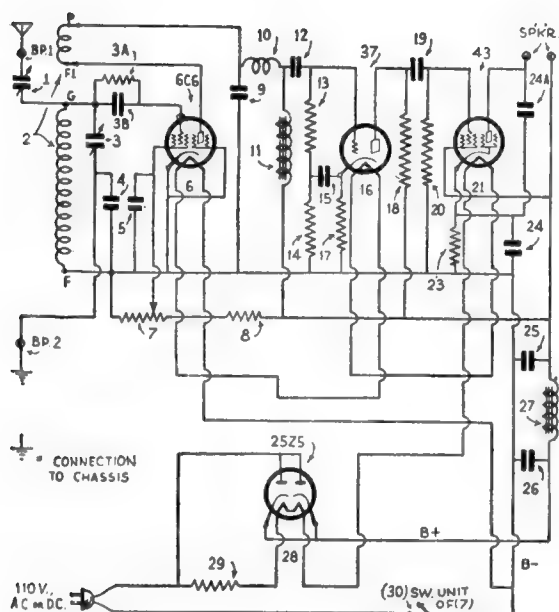


FINE PARTS BUILD FINE EQUIPMENT

Skilled workmanship and high quality materials make National parts perform better. Careful engineering fits them perfectly for the job they have to perform. National Parts are preferred by experimenters and constructors everywhere who know quality. Write for the National Catalogue describing this fine gear.

NATIONAL COMPANY, INC., MALDEN, MASS.

4-Tube S-W "Space Explorer"



Parts List

- 1—Hammarlund Variable Condenser, .00014 mf., type MC-140-M (3).
- 1—Hammarlund Ant. Trimmer Condenser, 3 to 35 mmf., type EC-35 (1).
- 1—Hammarlund Tube Shield, type TS-50 (6).
- 1—Set of four Na-Ald Short Wave Coils, type 704-SWS, 15 to 200 m. (2).

- 1—50,000 ohm Potentiometer (7) with Switch (30).
- 1—200 ohm, 75 watt Resistor, Slider Set at 190 ohms (29).
- 1—600 ohm Flexible Resistor (23).
- 1—1,500 ohm Flexible Resistor (17).
- 1—Mica Condenser, .0001 mf. (3B).
- 1—Mica Condenser, .00025 mf. (9).
- 1—Cartridge Condenser, 1 mf. (15).
- 1—Cartridge Condenser, 2 mf. (5).

Schematic wiring diagram, which makes it a very easy matter to build up the short wave "Space Explorer" here described by Mr. Cisin.

- 1—Metal Case Container, .5 mf. (4).
- 1—Cardboard Tube Condenser, 10 mf., 25 volts, (24).
- 2—Double Section Cardboard Container Electrolytic Condensers, 8 mf. per section (25, 26). Each dual condenser should have sections connected in parallel to total 16 mf. each.
- 1—15,000 ohm, ½ watt Resistor (8), Lynch.
- 1—30,000 ohm, 1 watt Resistor (18), Lynch.
- 2—150,000 ohm, ½ watt Resistors (13, 14), Lynch.
- 1—500,000 ohm, ½ watt Resistor (20), Lynch.
- 1—1 meg., ½ watt Resistor (3A).
- 1—Na-Ald 5-prong Moulded Sockets (16).
- 1—Line Cord and Plug.
- 1—Na-Ald 4-prong Moulded Socket (2).
- 3—Na-Ald 6-Prong Moulded Sockets (6, 21, 28).
- 1—Vernier Dial; 1 Knob.
- 1—Twin Binding Post (BP1, BP2).
- 1—Find-All R.F. Choke (10).
- 1—Find-All Plate Impedance (11).
- 1—30 henry, 250 ohm Audio Choke (27).
- 1—6C6 Tube (6); 1—37 Tube (16). R.C. A. Radiotrons.
- 1—43 Tube (21); 1—25Z5 Tube (28). R.C. A. Radiotrons.
- 1—Trutest Magnetic Speaker (22).
- 1—Roll Hook-up Wire, Solid Core.
- 1—Noise Eliminating Lead-in System.
- 1—Metal Chassis, 10x8x2 inches high. Blan; Insuline.
- 1—.005 mfd. paper condenser (24A).
- 2—.01 mfd. paper condensers (12, 19).

The popular A.C.-D.C. circuit simplifies the construction by eliminating the power transformer. Furthermore, it makes the set more flexible, permitting operation in either changeably on alternating or direct current.

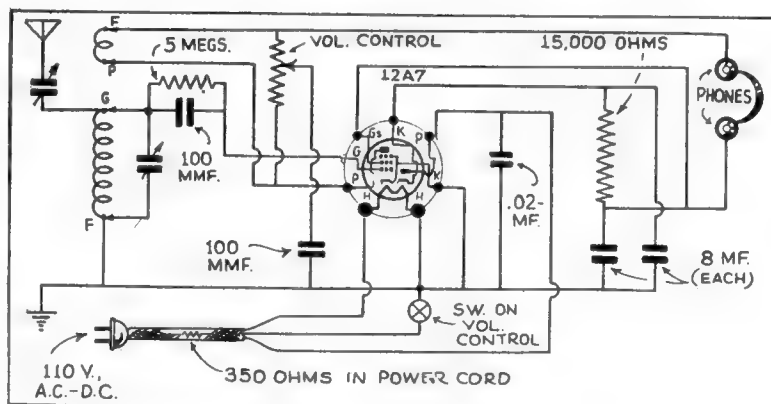
A 25Z5 rectifier is used. The filaments of all four tubes are connected in series with a wire-wound resistor, which serves the purpose of bringing the voltage down to the correct values required by the tubes.

—Short Wave Craft, Aug., 1934

1-Tube "Baby-Radio" Set

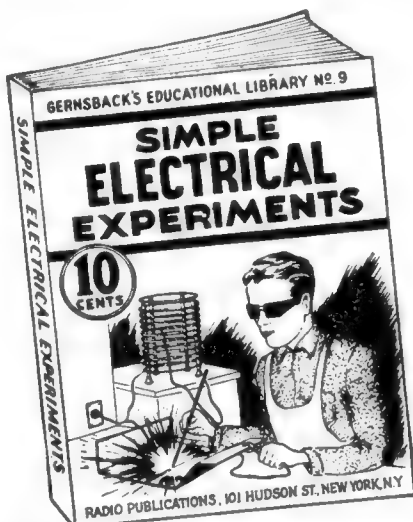
This novel receiver employs only one tube, but nevertheless it will operate on 110 volts A.C. or D.C. without any additional equipment. The 12A7 type tube is used as a combination rectifier and regenerative detector. The plug-in coil can be of a standard variety and one that employs 4 prongs.

The tuning condenser may have a value of approximately 200 mmf. and the aerial trimmer condenser will have a value of about 80 mmf.

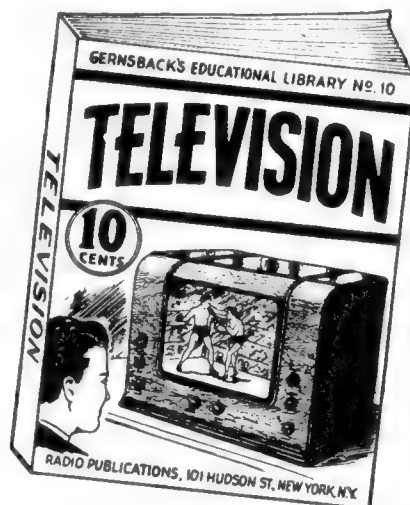


10 GREAT 10¢ RADIO BOOKS

RADIO FANS EVERYWHERE—these little ten cent text books give you an excellent foundation for the study of radio. They are clearly written, profusely illustrated and contain over 15,000 words in each book. You'll be amazed at the wealth of information these volumes have. They are handy for review or reference books.



**FAMOUS
GERNSBACK
EDUCATIONAL
LIBRARY**



NO. 9—SIMPLE ELECTRICAL EXPERIMENTS

Over 100 interesting and practical electrical experiments are described in this book, covering every branch of electricity—from simple experiments with magnets to high frequency "stunts". Among the experiments, all of which are clearly illustrated with special drawings, we find: Experiments with Magnets, Static Electricity, Transformers, Induction, Motors, High Frequency Machines, Switches and Lamps, Polarity Experiments, Dimmers, etc. All of the experiments described can be carried out with simple apparatus, most of which can be found about the home. Further, anyone can make them and thus this book becomes at once not only instructive but highly entertaining as well.

NO. 10—TELEVISION

Every one is asking the question—How does television work? This book explains all of the different systems of television from the simplest to the most complex. It describes in A-B-C style just how the image is scanned, how the scene is picked up by the television camera and broadcast to your home. Various types of television receiving systems are described in easily understood language, and the book is very completely illustrated with dozens of special drawings. The book tells how the accompanying sound for television images is picked up and transmitted and answers hundreds of other questions which the student and layman ask daily.

AND HERE ARE 8 MORE 10c BOOKS

NO. 1—HOW TO MAKE
FOUR DOERLE SHORT
WAVE SETS

NO. 5—BEGINNERS'
RADIO DICTIONARY

NO. 2—HOW TO MAKE
THE MOST POPULAR
ALL-WAVE 1- and 2-
TUBE RECEIVERS

NO. 6—HOW TO HAVE
FUN WITH RADIO

NO. 3—ALTERNATING
CURRENT FOR
BEGINNERS

NO. 7—HOW TO READ
RADIO DIAGRAMS

NO. 4—ALL ABOUT
AERIALS

NO. 8—RADIO FOR
BEGINNERS

BOOKS ARE ALL UNIFORM

Every book in the GERNSBACK EDUCATIONAL LIBRARY has 32 pages—with illustrations varying from 30 to 66 in number. Each title volume contains over 15,000 words. Positively radio's greatest book buys! If you do not think these books worth the price asked, return them in 24 hours and your money will be instantly refunded.

RADIO PUBLICATIONS • 20 VESEY STREET • NEW YORK, N. Y.

RADIO PUBLICATIONS, Dept. RT-2-40

20 Vesey Street, New York, N. Y.

Gentlemen: Please send immediately, POSTPAID, the book numbers circled below, I am enclosing cents—each book being 10c.

1 2 3 4 5 6 7 8 9 10
NEW NEW

☐ Send FREE listing of 48 new 10c publications.

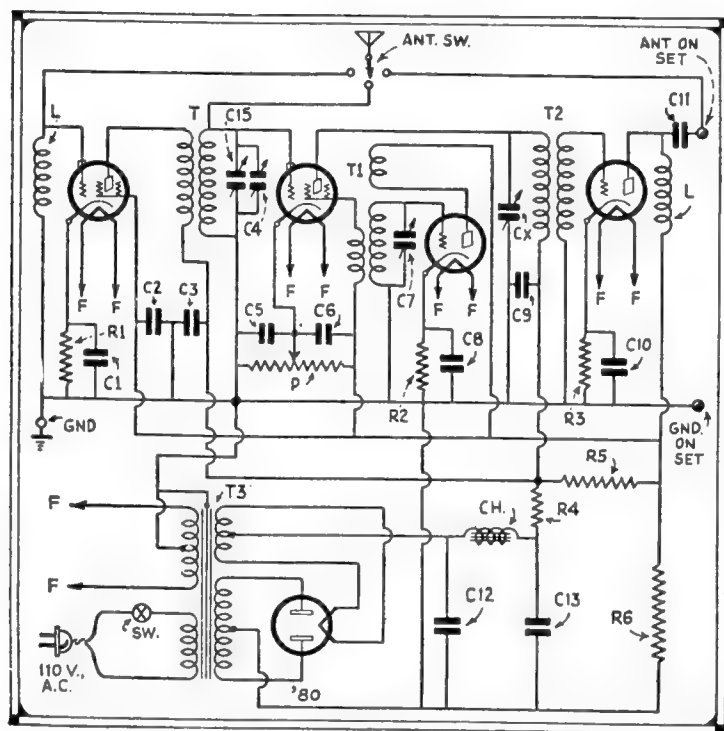
Name Address

City State

Remit by check or money order—register letter if you send cash or unused U. S. postage stamps.

MAIL COUPON TODAY!

An A.C. S-W Converter



Coil Data

20 METER BAND

Modulator coil:
Primary 1 turn.
Secondary 4 turns.
Oscillator coil:

Primary or pick-up 1 turn
Secondary 5 turns.
Tickler 3 turns.

40 METER BAND

Modulator coil:
Primary 4 turns.

Secondary 8 turns.
Oscillator coil.

Pick-up 3 turns.
Secondary 9 turns.
Tickler 7 turns.

Coils for other bands may be wound at will. The size of the wire is not so important; anything between No. 20 and No. 26 will be satisfactory.

List of Parts for Converter

T—Set of modulator coils as described.
T1—Set of oscillator coils as described.
T2—1 to 1 ratio R. F. coil for midget condenser.

T3—Power transformer.

Ch—30 henry choke.

L—2-85 millihenry chokes.

C1, C2, C3, C5, C6, C8, C9, C10—Eight .1 mf. by-pass condensers.

C4, C7—Two .00015 mf. tandem tuning condensers.

C15—midget condenser across C4, approximately .00005 mf.

C11—.00025 mf. fixed condenser.

C12, C13—Two 4 mf. electrolytic filter condensers.

CX—Small tuning condenser, such as a trimmer.

R1—300 ohm bias resistor.

R2, R3—Two 1000 ohm bias resistors.

R4, R5—Voltage divider tapped at 3400 ohms. Total value 17,900 ohms.

R6—One 17,900 ohm bleeder resistor.

P—25,000 ohm potentiometer with AC switch.

6—UY sockets.

1—UX socket.

1—Dial (vernier type).

2—24A tubes.

2—27 tubes.

1—80 tube.

4—binding posts.

Hardware.

1—25 foot roll "pushback" hook-up wire.

—Short Wave Craft, Dec., 1932.

A 2-Tube Portable All-Wave Receiver

Coil Data

Secondary

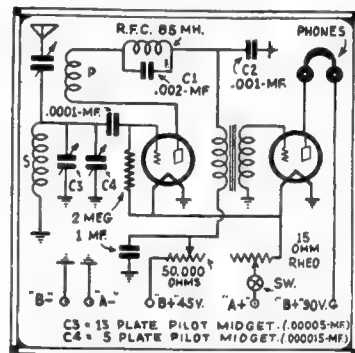
20 meters	7 T. No. 22 D. C. C.
20 "	9 " ditto
40 "	17 " ditto
80 "	21 " ditto
80 "	28 " ditto
Broadcast	90 T. No. 36 S. S. C.

Primary

6 turns No. 32 D. C. C.
7 " ditto
8 " ditto
7 " ditto
7 " ditto
10 turns No. 22 D. C. C.

When the author operates this set at his home station, a .0005 mf. condenser in parallel with a 25 turn $1\frac{1}{2}$ " coil is put in series with the antenna.

Any type triode tubes may be used in



this set, but the author recommends 30's. The antenna is coupled to the set through a small trimmer condenser, fastened directly to the antenna binding post.

—Short Wave Craft, Feb., 1933.

"ENGINEERED..."

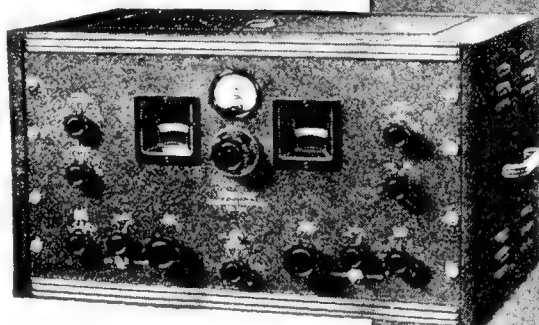
from every

ANGLE —

THE Series 200 "Super-Pro" is a masterpiece of engineering. Every detail has been given the utmost consideration and engineered to produce a receiver of maximum flexibility. The "Super-Pro" is a "professional" receiver from start to finish. Engineers choosing "Super-Pro" receivers for commercial service know that they are buying uninterrupted service and peak efficiency. Just look inside one of these receivers and you will see the difference. Everything in it is specially designed. Even the I.F. transformers are totally different from any other set. The special band switch is probably the only one of its kind in the field. All these are manufactured right in our own factory where absolute control of quality is maintained.

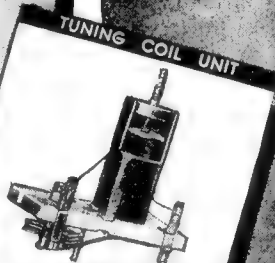
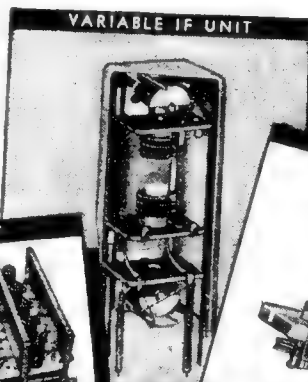
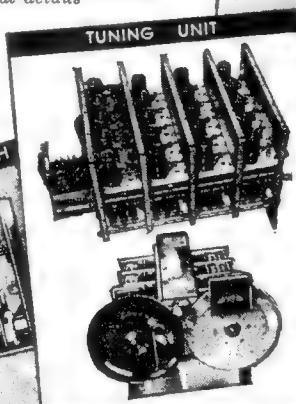
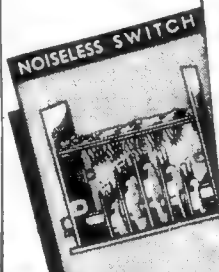
*Write for complete
technical details*

Canadian Office:
41 West Ave., No.,
Hamilton, Ont.



New
**SUPER
PRO**

**SERIES
200**



MAIL THIS COUPON NOW

HAMMARLUND MFG. CO., INC.
424-438 W. 33rd Street, New York City
Please send 16-page "Super-Pro" booklet

Name

Address

City State

HAMMARLUND

5 Meter Transmitter and Receiver

MARCUS L. POTTER

Parts List Transmitter-Receiver

Receiver

- L1 11 turns No. 14 wire space wound $\frac{1}{2}$ inch diameter.
 L2 4 turns No. 14 wire space wound $\frac{1}{2}$ inch diameter.
 L3 Interruption frequency oscillator: primary or grid coil 1,400 turns: secondary or plate coil 900 turns honeycomb type of windings.
 VT1 type 30 tube, R.C.A. Radiotron (Arco).
 VT2 type 31 tube, R.C.A. Radiotron (Arco).
 VT3 type 49 tube, R.C.A. Radiotron (Arco).
 C1 .000035 mf. Hammarlund midget receiving variable condenser.
 C2 .0005 mf. fixed condenser.
 C3 .002 mf. fixed condenser.
 C4 .01 fixed condenser.
 C5 .002 mf. fixed condenser.
 C6 .00005 mf. Pilot midget variable condenser.
 R1 1 megohm 1 watt resistor Lynch.
 R2 30 ohm fixed resistor (Amperite).
 AT audio transformer.
 OT output transformer
 VC 50,000 ohm volume control with "on-off" switch.
 RFC 50 turns No. 30 D.S.C. wire close wound on $\frac{3}{8}$ " rubber rod.

Transmitter

- L5 Antenna coils, each 1 turn No. 14 wire 1" diameter, $\frac{1}{8}$ " spacing.
 L6 Plate tank coil, 5 turns No. 14 wire 1" diameter, $\frac{1}{8}$ " spacing CT.
 L7 Grid coil 11 turns No. 14 wire $\frac{1}{2}$ " diameter space wound CT.
 C7 Plate tank tuning condenser. Ham-

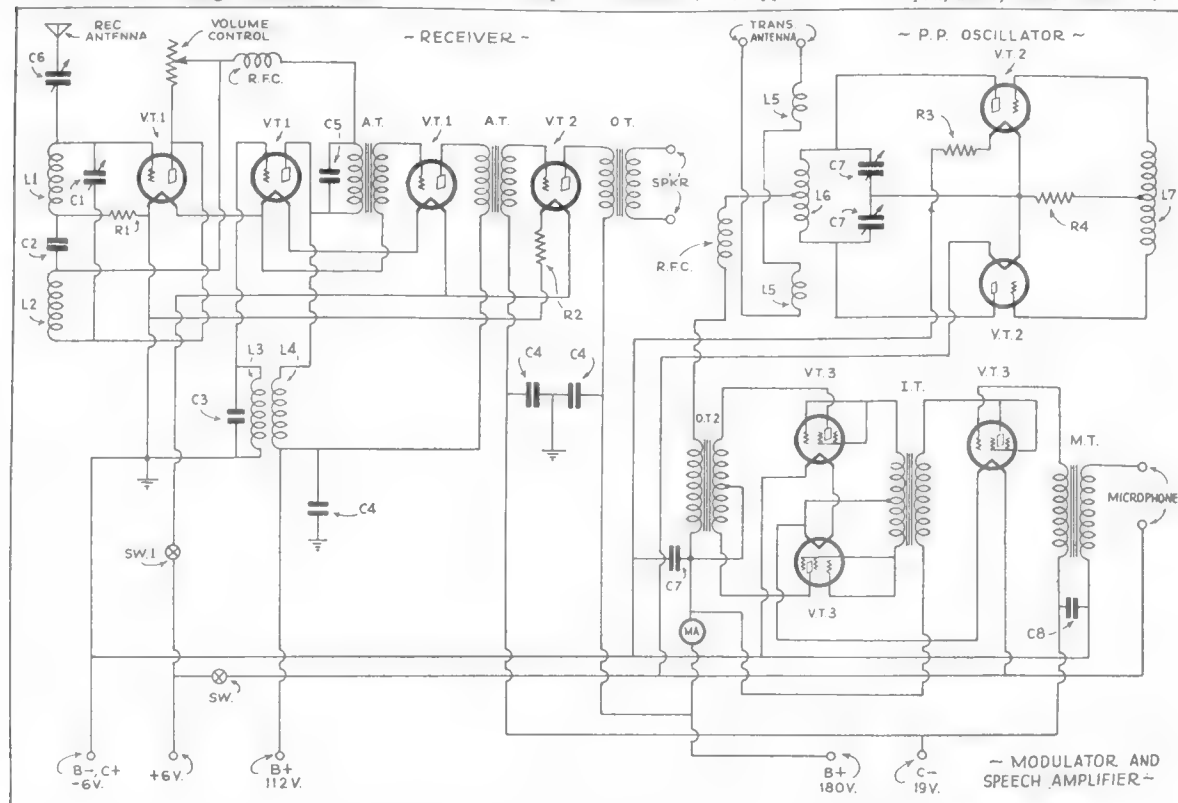
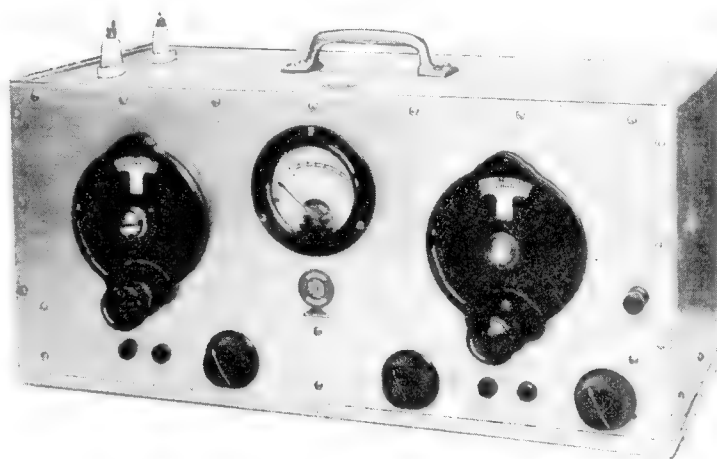
- marlund .000035 mf. each section.
 R3 15 ohm fixed resistor (Amperite).
 R4 100,000 ohm 1-watt grid leak Lynch.

Modulator and Speech Amplifier

- MT Acme single button microphone transformer.
 IT class II input transformer, for type

- 49 tubes.
 OT2 class B output transformer, for type 49 tubes and 5,000 ohm load.
 MA C-100 D.C. milliammeter.
 C7 1 mf. Aerovox fixed bypass condenser.
 C8 .002 mf. Sangamo fixed condenser.
 SW Off-on switch.

—April, 1934, Short Wave Craft.



THREE STAR RADIO VALUE

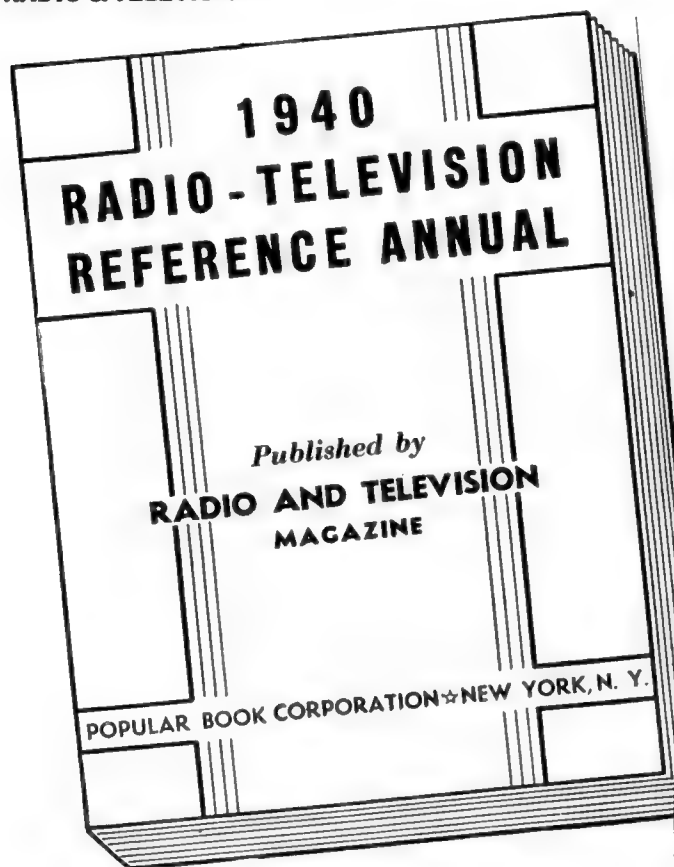
WITH our compliments, we want to send a copy of the 1940 RADIO-TELEVISION REFERENCE ANNUAL to you FREE. If you will simply take advantage of RADIO & TELEVISION magazine's special subscription offer NOW. This offer is being made for a limited time only.

The 1940 RADIO-TELEVISION REFERENCE ANNUAL has 68 pages, large size 8½ x 11½, with over 170 illustrations. The contents of this book has never appeared before in handy book form. Its pages cover practically every branch of radio sound, public address, servicing, television, construction articles for advanced radio men and technicians, time and money-saving kinks, wrinkles, useful circuit information, "ham" transmitters and receivers, and a host of other data.

The Annuals have always been regarded as a standard reference work for every practical branch of radio operation and service. This 1940 edition ably sustains this reputation. Every radio man wants a copy of this valuable book. Just as this book will be of unquestionable value to you, so, too, will every monthly issue of RADIO & TELEVISION. This magazine brings you big value every month. It keeps you intelligently informed about new developments in radio and television. You want the news, want it fully but concisely, want it first—that is why you should read RADIO & TELEVISION regularly.

This very special offer is made for just one purpose—we want you as a regular subscriber. The Annual, whose contents appears at the right, is not sold, but a copy is FREE to you if you subscribe now.

**SAME SIZE AS
RADIO & TELEVISION**



**Read the summary of contents
in this FREE BOOK!**

BEGINNER'S SIMPLE INEXPENSIVE CONSTRUCTION ARTICLES

Beginner's Breadboard Special - a 1-Tube High-Gain All-Wave Receiver—Wiring Pointers for Radio Beginners—A Watch Charm Size 1-Tube Set—Beginner's Simple Volt-Milliammeter—Making a 1-Tube Broadcast Loop Receiver—A.C.-D.C. Power Supply for Battery Portables—A 1-Tube Short-Waver with Band Coil Switching.

MORE ADVANCED SET CONSTRUCTION

The "High-Seas 4" Broadcast Lamp Radio—How to Build a 6-Tube 1.4-Volt Short-Wave Superhet for the "Ham" or Short-Wave Fan—Build the "Lunch Box 5" Super Set - a Broadcast Battery Portable—How to Build a Plug-Together 8 Tube Broadcast Set—The "5-in-4" All-Wave Radio for A.C. Operation—An Easily-Built 3-Tube Midget Broadcast Superheterodyne Receiver.

THE SERVICEMEN'S SECTION

Bass Tone Control—Simplified Variable Selectivity—Practical Servicing Pointers—Servicing Universal A.C.-D.C. Receivers—Killing the "Intermittent" Bug—A Service Shop A.C. to D.C. Power Supply—Sideline Money for Servicemen—Adding A.V.C. to any Screen-Grid T.R.F. Receiver—Iron Particles in Speaker Air Gap.

TEST INSTRUMENTS

A Useful Neon Lamp Tester—An Inexpensive Output Meter—Making Milliammeter Multipliers—Home-Made Frequency Modulator—The Busy Servicemen's V.T. Volt-Meter.

PUBLIC ADDRESS AND AMPLIFIERS

Build this Combination A.C.-D.C. Radio and Inter-Communicator—Speaker Placement in P.A. Work—The Design and Construction of an Inexpensive All-Push-Pull 10-Watt Amplifier—Obscure Sources of Hum in High-Gain Amplifiers—How to Build a High-Fidelity 5-Watt Versatile Amplifier.

"HAM" SECTION

Ultra-High Frequency Antennas—The Beginner's Low-Cost Xmitter—Modulator Meter—Phone Monitor—The Beginner's "Ham" Receiver—2½ Meter Acorn Transceiver.

TELEVISION

How to Build a 441 Line T.R.F. Television Receiver—Useful Notes on Television Antennas.

MISCELLANEOUS

Simple Photo-Cell Relay Set Up—Making a Burglar Alarm—How to Build A.C.-D.C. Capacity Relay—How to Make a Modern Radio Treasure Locator.

USEFUL KINKS, CIRCUITS AND WRINKLES

Making a Flexible Coupler—Two-Timing Chime—A Simple Portable Aerial—An Improved Non-Slip Screw-Driver. NOTE: The book contains numerous other useful Kinks, Circuits and Wrinkles, not listed here.

170 ILLUSTRATIONS

68 BIG PAGES

RADIO AND TELEVISION

20 VESEY ST., NEW YORK, N. Y.

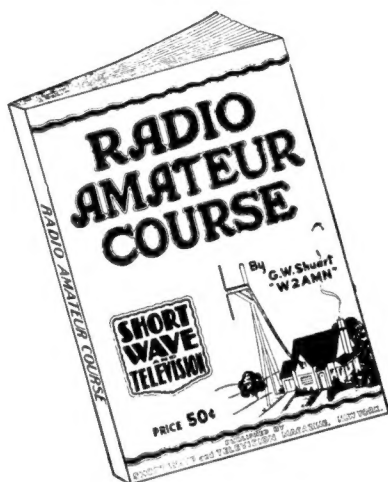
Gentlemen: Enclosed you will find One Dollar for which enter my subscription to RADIO & TELEVISION Magazine for Eight Months. Send me **ABSOLUTELY FREE** and **POSTPAID**, my copy of 1940 RADIO-TELEVISION REFERENCE ANNUAL.

☐ This is a new order

☐ Extend My Present Subscription

NAME ADDRESS

CITY STATE



Your Money Back—

IF THE **RADIO AMATEUR COURSE** DOES NOT REPRESENT THE GREATEST BOOK VALUE EVER OFFERED TO THE RADIO "FANS" FOR 50c

TO convince you that there isn't a better book buy today, the publishers of the **RADIO AMATEUR COURSE** make the sensational offer of a money-back guarantee on such a low-priced book. Stop in at any of the many dealers listed at the right and examine this volume. See for yourself if the **RADIO AMATEUR COURSE** isn't just the book you've always wanted.

Printed on the finest quality paper—well illustrated attractive 4-color cover—complete with radio information you must have. It contains a step-by-step program for obtaining a short-wave radio education.

Written by **George W. Stuart, W2AMN**,
foremost short-wave authority

148 PAGES

6¼ x 9½ INCHES

**OVER 150 RADIO DIAGRAMS
and TECHNICAL PHOTOGRAPHS**

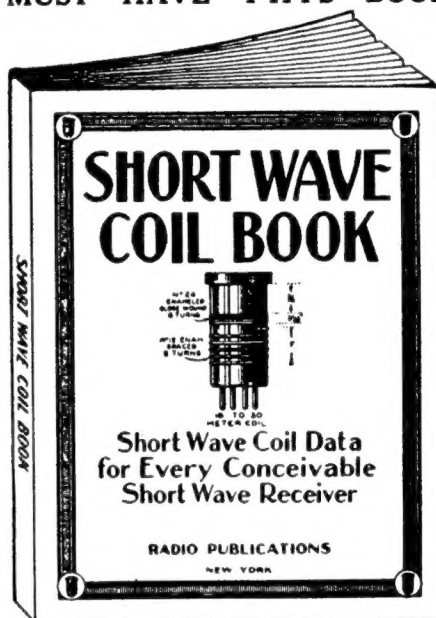
RADIO AND TELEVISION, 20 Vesey Street New York, N. Y.

Gentlemen: I enclose herewith my remittance of Fifty Cents (50c) for which please send me POSTPAID, my copy of the **RADIO AMATEUR COURSE**. (Remit by check or money order; register letter if you send cash or unused U. S. Postage Stamps.)

Name
Address
City State

HERE IT IS

**SHORT WAVE SET BUILDERS
MUST HAVE THIS BOOK**



- **F**OR the first time, it is now possible for the experimenter and short wave enthusiast to obtain the most exhaustive data on short wave coil winding information that has ever appeared in print.

As every experimenter who has ever tried to build a short wave set knows only too well by experience, the difference between a good and a poor receiver is usually found in the short wave coils. Very often you have to hunt through copies of magazines, books, etc., to find the information you require. The present data has been gotten up to obviate all these difficulties.

Between the two covers of this book you now find every possible bit of information on coil winding that has appeared in print during the past two years. Only the most modern "dope" has been published here.

- **No duplication.** Illustrations galore, giving not only full instructions how to wind coils, but dimensions, sizes of wire, curves, how to plot them, by means of which any coil for any particular short wave set can be figured in advance, as to number of turns, size of wire, spacing, etc.

There has never been such data published in such easy accessible form as this.

- **Take advantage of the special offer we are making today, as due to increasing costs, there is no question that the price will increase soon.**

RADIO PUBLICATIONS

20 VESEY STREET

- **NEW YORK, N. Y.**

**RADIO PUBLICATIONS,
20 VESEY STREET NEW YORK, N. Y.**

Please send immediately, your **Short Wave Coil Book**, for which I enclose 25c herewith (coin, U. S. stamps or money order acceptable). Book is to be sent prepaid to me.

Name
Address
City and State



J. E. SMITH, President
National Radio Institute

HERE ARE A FEW EXAMPLES OF THE KIND OF MONEY I TRAIN MY MEN TO MAKE

NOW OWNS OWN BUSINESS

"If I had not taken your Course I would be digging ditches instead of running my own business. One week I made \$75 on repairing alone, and this doesn't count sales. If a fellow wants to get into Radio, N. R. I. is the starting point."

R. S. Lewis,
Modern Radio Service,
Pittsfield, Ill.

CLEAR \$4500 IN 16 MONTHS

"Before taking your Radio Course I was making \$18 a week. I came here three years ago. In about 16 months I made about \$4500 in Radio. I cannot say too much for the wonderful help I have received from N. R. I."

Noel W. Ray,
619 Broad St.,
Gadsden, Alabama.

SPARE TIME WORK PAYS \$18 A WEEK

"I only do spare time Radio work and average \$18 a week. People who in good times would buy a new Radio, now have the old one fixed."

Stephen J. Drapachy,
407 Wunderlich Avenue,
Barberton, Ohio.

FREE: Radio Servicing Tips

Let me PROVE that my Course is clear, easy to understand and fascinating to study. Send the coupon for a free lesson, "Trouble Shooting in D.C., A.C., and Battery Sets." This interesting lesson gives 132 ways to correct common Radio troubles. I am willing to send this book to prove that you too can master Radio—just as thousands of other fellows have done. Many of them, without even a grammar school education, and no Radio or technical experience, have become Radio experts and now earn two or three times their former pay. Mail the coupon now.

I WILL HELP YOU START A SPARE TIME OR FULL TIME RADIO SERVICE BUSINESS WITHOUT CAPITAL

FREE BOOK TELLS HOW MAIL COUPON!

The world-wide use of Radio sets for home entertainment has made many opportunities for you to have a spare time or full time Radio business of your own. I give you instructions early in your Training for doing 28 Radio jobs common in almost every neighborhood. Many N. R. I. men make \$5, \$10, \$15 a week extra in spare time while learning. I show you how to install and service all types of receiving sets. I keep you up to date with all new developments, such as Short Wave and Automobile Radio. I give you Radio equipment and instructions for conducting experiments, for building circuits and testing equipment, and for making tests that will give you broad, practical Radio experience. Clip the coupon below and get my free 64-page book, "Rich Rewards in Radio"—it gives you a full story of the success of N. R. I. students and graduates, and tells how to start a spare time or full time Radio business on money made in spare time while learning.

MANY N. R. I. MEN MAKE \$5, \$10, \$15 A WEEK EXTRA IN SPARE TIME WHILE LEARNING

Many of the seventeen million sets now in use are less than 50% efficient. I will show you how to cash in on this condition. I will show you the plans and ideas that have enabled many others to make \$5, \$10, \$15 a week in spare time while learning. Ford R. Leary, 1633 Davison Road, Flint, Mich., wrote: "My part-time earnings while taking the N. R. I. Course were \$651."

GET READY NOW FOR A RADIO BUSINESS OF YOUR OWN AND FOR JOBS LIKE THESE

Broadcasting stations use engineers, operators, station managers, and pay up to \$5,000 a year. Radio manufacturers use testers, inspectors, foremen, engineers, servicemen and buyers, and pay up to \$6,000 a year. Radio dealers and jobbers employ hundreds of servicemen, salesmen, managers, and pay up to \$5,000 a year. Radio operators on ships enjoy life, see the world, with board and lodging free, and get good pay besides. My book tells you of the opportunities in these fields, also in Aviation Radio, Television, Police

Radio, Short Wave Radio, Automobile Radio and other new branches of this fast growing industry. Get it.

I TRAIN YOU AT HOME IN YOUR SPARE TIME

Hold your job until you're ready for another. Give me only part of your spare time. You do not need a high school or college education. Hundreds with only a common school education have won bigger pay through N. R. I. J. A. Vaughn jumped from \$35 to \$100 a week. J. E. McLaurine increased his earnings 100 per cent. The National Radio Institute is the Pioneer and World's Largest organization devoted exclusively to training men and young men by Home Study for good jobs in the Radio industry.

YOU MUST BE SATISFIED

I will give you an agreement to refund every penny of your money if you are not satisfied with my Lesson and Instruction Service when you complete my Training. And I'll not only give you thorough training in Radio principles, practical experience in building and servicing sets, but also Advanced Specialized Training in the type of Radio work you choose.

GET MY FREE BOOK OF FACTS

Mail the coupon for "Rich Rewards in Radio." It's free to any ambitious fellow over 15 years old. It tells you about Radio's spare time and full time opportunities; about my training; what others who have taken it are doing and making. Mail coupon now in an envelope or paste it on a 1c post card.

J. E. SMITH, Pres.
Dept. 5CY
National Radio Institute
Washington, D. C.



This Coupon is Good For One FREE Copy of My Book

J. E. SMITH, President,
National Radio Institute, Dept. 5CY,
Washington, D. C.

Dear Mr. Smith: Without obligation, send me the Service Manual and your free book about spare time and full time Radio opportunities, and how I can train for them at home in spare time. (Please print plainly.)

Name John E. Smith Age 35

Address 1225 1st St. N.W.

City Washington State D.C. M

ISBN 0-917914-038-2